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REPORT

ON THE

AGRICULTURE OF THE DISTRICT OF CUTTACK.

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REPORT

ON THE

AGRICULTURE OF THE DISTRICT OF CUTTACK.

CHAPTER I.

TOPOGRAPHY, PHYSICAL ASPECTS, AND GEOLOGY.

SECTION 1.—*Topography and physical aspects.*

Topography.—Cuttack is one of the three districts included in the Orissa Division. It is bounded on the north by the Balasore district, or more correctly by the Baitarani river and Dhamra estuary, which separate it from the district of Balasore; on the east by the Bay of Bengal; on the south by the district of Puri; and on the west by the Tributary States of Orissa.

Area.—The area comprised within these boundaries according to the present census of 1891 is 3,633 square miles.

Administrative divisions of the district.—There are three subdivisions, ten police-stations, and three munsifis in the district, as given in the following statement:—

Subdivisions.	Police-stations.	Munsifis.
Cuttack Sadar	Cuttack Banki. Salipur. Jagatsingpur. Tirtol.	Cuttack.
Kendrapara	Kendrapara Patamundi. Aul.	Kendrapara
Jajpur	Jajpur Dharamsala.	Jajpur.

The chief administrative station of the district is the city of Cuttack. It is the head-quarters of the Collector and Magistrate, of the Divisional Commissioner, and of the District Judge. The Collector exercises control over the revenue of Angul. The Commissioner of the Division is at present also the Superintendent of the Tributary States of Orissa, and the civil jurisdiction of the Judge of Cuttack extends over all the British districts of Orissa, including Balasore and Puri. In his criminal functions this last officer holds Sessions also at Balasore and Puri at certain periods of the year. The Munsifi of Jajpur includes thanas of the Balasore district, viz., Bhadrak, Basudevpur, Dhamnagar, and Chandbali.

SECTION 2.—*General physical aspects and geological formation.*

The district with regard to its general physical aspects and geology may be conveniently divided into three regions, viz.—

(1) A low forest strip of land which extends all along the seashore from the river Dhamra on the north to the Devi on the south.
(2) A cultivated alluvial plain, formed from the deposits of its great rivers, forming the deltaic tract.
(3) A group of hills forming the western frontier.

The first region may be said to be the Sunderbans on a miniature scale. It is a low woodland tract with swamps and marshes, intersected by innumerable winding creeks which are bounded on either side by low jungle, consisting for the most part of canes, brushwood, and coarse reedy grass. Travelling here has to be done in these parts by little streams which wind along into the very heart of the jungle, forming a highway for country boats which carry wood to the inhabited villages in the adjoining delta. All this portion of the country is subject to inundations of seawater, which deposits its salt on the surface of the low ground all around. The greater part of this region belongs to the Kanika and Kujang estates, small tracts coming in also within Aul, Harishpur, and other zamindaris.

The deltaic portion of the country is altogether a plain level extending from the Garjats or hills on the west of Cuttack very nearly to the seashore, on the uniform surface of which is scarcely to be seen a single rocky elevation. There are no stones of any kind beyond the limestone nodules or concretions which are found dispersed pretty largely throughout the whole extent of the delta. The concretions, which go by the local name of *genguti,* are round or spheroidal nodules of calcareous matter, which are gathered in large masses and put to many economical uses. They are found scattered over the *nalas* in the vicinity of the hills, and in some cases considerably below the delta heads of the rivers. The largest portion of the delta may be described as highly cultivable land, being of a light sandy character, and acquiring a more clayey consistency as it approaches the hills.

The hilly region on the west is covered with forests, and is intersected by many fertile valleys and plains. Its furthest distance from the sea-coast is about 60 to 70 miles, although in many parts the breadth of the alluvial plain does not exceed 15 or 20 miles. On the examination of maps, this region may be mistaken to consist of a continuous chain of hills, but a little personal experience of the tracts will show that the hills occur in irregularly scattered groups, standing out often as isolated mounds altogether disconnected at the base, rising in the form of a cone to a height varying from 200 or 300 to 1,500 or 2,500 feet. Their length is not much more than 15 miles, and their direction is parallel with the main faults of the district. With the exception of a few naked bluffs, they are for the most part covered with vegetation. Their outline as a rule, though abrupt, is generally rounded, presenting all the appearances due to marine action. Some, on the other hand, which from a distance appear to be quite flat-topped, really consist of a series of steep ridges, intersected by low fertile valleys, cut out by the denuding action of running water. The hills south of the Brahmani, including the elevations in Bolorampur, Madhupur, Darpan, Kalkala, all along the High Level Canal, contain rocks mostly of a granitic formation, occurring as isolated conical peaks covered over with low vegetation. These vary in height from about 200 to 1,000 feet. The prevailing colour of the principal rock in the district is red, due, no doubt, to the presence of quantities of iron. This rock is what is known as laterite, a most peculiar substance, which in the early days of geological investigation in India, gave rise to all kinds of conflicting opinions with regard to its true nature and character. The name was originally proposed by Buchanan, and confined by him strictly to a peculiar kind of semi-indurated, highly ferruginous clay. When freshly extracted from a quarry, it is in many instances so soft, that it can be readily cut into any required form, but on subsequent exposure to the air, it gets quite dry and hardened, being changed in its consistency, according to old writers, by some chemical change in its contained oxide of iron. It would be interesting to notice here the description given of laterite by Mr. Stirling in his account of Cuttack. He writes thus:—

> "It (*i.e.*, laterite) lies in beds of considerable depth at the foot of the granite hills, often advancing out for a distance of 10 or 15 miles into the plains, where it forms gently swelling rocky elevations, but never rises into hills; sometimes it is disposed in the manner of flat terraces of considerable dimensions, which look as if they had been constructed with much labour and skill. The composition and aspect of the Cuttack iron-clay are very remarkable, from the innumerable pores and amygdaloidal cavities which it contains, filled with white and yellow lithomarge, and from the quantities of iron ore, pebbles, and fragments of quartz imbedded in it. By far the most interesting circumstance, however, connected with it, is its complete and intimate mixture with the granite, which has been traced in several instances, and specimens of which are in my possession, exhibiting the one rock entirely invested by the other, though it is not easy to pronounce which is the enclosing substance. The granite, at the places where the specimens were principally collected,

appears to burst through an immense bed of the laterite, rising abruptly at a considerable angle. Numerous broken fragments are strewed all around the line of junction, and in some specimens the two rocks are so mixed together as to form a sort of coarse breccia or conglomerate."

With regard to its origin, from a paper written by Messrs. W. T. and H. F. Blandford and William Theobald, junior, of the Geological Survey of India, it appears that the laterite of the Cuttack district has not been the result so much of the peroxidation of the iron contained in the metamorphosed rock, as of the addition of an oxide of iron from an extraneous source, most probably in the form of an infiltration from springs. This impregnation in some instances goes on so far, that all traces of the original rock disappear, and the soil presents nothing but small fragments of peroxide of iron, which give it a consistency which it would not otherwise possess. When exposed, this soil appears held together firmly by the hydrate of iron, which gives it, moreover, the brown glazed appearance observable in laterite, and the atmosphere helps by its action to increase the hardness. The amount of metallic iron contained in laterite varies from 25 to 35 per cent., while the peroxide varies from 32 to 50 per cent. The following analysis made in the laboratory of the School of Mines, London, as taken from Medlicott and Blandford's Geology of India, gives its composition more accurately :—

Soluble Acids.	
Peroxide of iron	46·279
Alumina	5·783
Lime	·742
Magnesia	·090
Silica	·120
Insoluble in Acids.	
Silica (dissolved by potash)	6·728
Silica (by fusion)	30·728
Lime, iron, and alumina	2·728
Combined water, alkalies and loss	6·802
	100·000

This is equal to 32·4 per cent. of metallic iron. For purposes of building, laterite is divided into two classes—the one being dark coloured and coarse grained and weighing 156lb to the cubic foot, the other light coloured and of a looser texture, weighing 130lb to the cubic foot.

South of the Mahanadi, the hills of Dompara contain white and variegated sandstone, interspersed among the granitic rocks. In this neighbourhood is to be found a white lithomarge, which is used by the Uryas for the preparation of a white wash, with which they ornament their houses. It is locally known as *tilakamati*, being used for *tilaks* or caste marks on the face or body. As the ascent is made further north to killa Sukinda, which lies at the extreme western corner of the Jajpur subdivision, the hills are found to be composed of white granite and gneiss rocks. At Sukinda Gúrh, I was told by a man, who seemed to be pretty well acquainted with the geological formation of his part of the country, that mica forms a large constituent of the rocks here. It would seem also, that chlorite and talc are found in abundance. The evidence of the presence of chlorite may be seen among the antiquities of Jajpur, which are so eloquently described by Sir William Hunter in his Statistical Account of Cuttack. Huge monolithic pillars and columns, sculptured slabs which decorate the temples, and colossal images of gods and goddesses, are all cut of this greenstone. Coal is supposed to exist in these hills on the western portion of the district, but from the investigations which have been made from time to time, notably the enquiry made by the Geological Survey Party, consisting of Messrs. Blandford and Theobald, in 1855, it would appear that no beds of workable coal occur in the district, and that what may be found would be nothing else but a shale of a dull black colour.. From what has been already mentioned, it will be observed that iron is found diffused in many of the Cuttack hills in the form of an ore. The smelting, though done in many of the Tributary States, is not carried on to any extent within the district. At Sukinda, however, I found that the aboriginal natives manufacture a little iron with their rude implements. An account of the process will be given in its proper place. Some of the rivers which pass through this western hilly tract are said to have golden sands. If this be true, the proportion in which the metal is mixed with the sand is so infinitesimal, that no attempt has ever been made to collect it.

For economic purposes, the rocks have been divided by the natives of Cuttack into two great classes, viz.—

(*a*) Those that are extremely compact and hard and are unworkable, and are hence called "*akarma sila.*" Some of them, however, separate naturally into rough slabs, and are used uncut for door steps and for similar purposes.

(*b*) Those that can be easily cut, and used for building and other purposes.

The following classification gives a more detailed description of the rocks mentioned above:—

(1) *Igneous rocks.*—These, as above stated, are very limited in extent, and are chiefly granitic in their composition. Some contain pure quartz and felspar, while others are made up of two or three varieties of felspar, such as albite and adularia, with large crystals of mica and quartz. The minerals of these rocks are not very numerous. Tourmaline is found in large crystals in some of the intrusive felspathic rocks. Adularia, quartz, and mica are the essential minerals.

The granite here is older than the sedimentary rocks of the district. It is most probably of the same age as the metamorphic gneissose rocks, as would appear for the following reasons:—

(*a*) They are very highly crystallized, the distinct character and position of the large crystals showing that their rate of cooling must have been very slow, and this slow cooling can only be explained by supposing that the surrounding mass must have been in a molten condition or in an intensely heated state during the time of the intrusion of these dykes.

(*b*) The metamorphosis of the gneissose rocks themselves also points to the fact of their being changed only when these granitic veins and dykes were themselves in a heated condition.

(2) *Metamorphic rocks.*—These are composed chiefly of gneiss, which is either micaceous, quartzose or hornblendic.

The variety which prevails largely is almost made up entirely of quartz, the felspar having gradually disappeared and mica being present only in small quantities. It can be very readily distinguished from the granite dykes of the district by its cleavable character.

Some of these gneissose rocks are hard, coarse and compact, while others are very soft and laminated, one variety, called by the natives of the district *boulmala*, being very interesting from its containing garnets which are found frequently decomposed. The variety prevailing in the hills north and north-west of Cuttack is "granular and quartzose, showing little indication of foliation, except when seen in the mass, and containing abundantly red spots of peroxide of iron which replace decomposed garnets." When the decomposed upper portion of these metamorphic rocks is found impregnated with iron, it is converted into a kind of lithomarge, which very closely resembles laterite in appearance and is used for the same purpose.

These metamorphic rocks contain a great variety of minerals, the variations running parallel with their planes of foliation, which generally dip at a very high angle. The faults of the district have the same direction, viz., W.N.W. to E.S.E., affecting the general position of the hills themselves, many of which from their abrupt character point to their production by these faults.

(3) *Sedimentary rocks.*—These chiefly consist of grit, sandstone and conglomerates, also partly carbonaceous shales, and one or two beds of clay. Laterite, which forms such an important rock in the district, although of debrital origin, has been excluded in this general classification, as it has been found to be more or less a purely superficial deposit.

These sedimentary rocks occur in two important distinct basins, known, respectively, as the Talchir and Atgarh basins. Although both these are practically out of the district, yet their close proximity demands a full description, without which any account of the geology of the Cuttack district must be necessarily very incomplete. The same remarks apply equally to all the hills on the western frontier of the district, which strictly belong to the Tributary Mahals. I must therefore plead for indulgence, if in this chapter I seem to dwell too much on the geology of these hills, which, though bordering naturally on the country, may not yet extend into the district administered from Cuttack.

A second classification, compiled from reports published from time to time in the "Memoirs of the Geological Survey of India" is now appended. It gives a list of the rock systems in their descending order:—

Section in descending order.

	Names.	Characters of beds, subdivisions, &c.
1.	Blown sands	Found in very small quantities along the coast, where the land is found covered with sand blown inland from the beach by the monsoon.
2.	Alluvium	(*a*) River delta deposits.—Less sandy than the older alluvium deposits, from which it is distinguished by the flatness of its surface, showing that the area it occupies has been formed by deposition and not by denudation. (*b*) Older alluvium of the coast plain.—Consists more of a mixture of clay and sand, and is distinguished from all beds which may resemble it by its more sandy character, and by its containing nodules of carbonate of lime.
3.	Laterite	Consists of small pisolitic nodules, which are impregnated with an oxide of iron. It differs from the more massive form of laterite which is found in other parts of South India by its less compact character.
4.	Mahadeva or Panchet sandstone and grit or Upper grit series.	Unfossiliferous, quartzose grits, conglomerates and coarse sandstones.
5.	Damodar group or Carboniferous shale series.	Fossiliferous—inter-stratifications of shale with sandstone and ironstone.
6.	Talcher or Lower sandstone series.	But slightly fossiliferous—blue nodular shale with fine sandstone.
7.	Metamorphic or Crystalline rocks.	Gneiss, mica-schist, hornblende schist, quartzite, &c.

SECTION 3.—*Hill system.*

The hilly region of the district has been described in a preceding section. Most of the hills, with the exception of a few isolated peaks near the town of Cuttack, form the western frontier of the district. The most important of these elevated tracts with their areas are given in the following table, which is taken from the Physical Statistics of the district prepared by the Collector in the year 1877-78 :—

Names of tracts.		Area in square miles.
1. Palijori	... ...	19·99
2. Kanchikund	... ...	·01
3. Patia	... ...	·84
4. Bolorampur	... ...	3·83
5. Sukinda	... ...	10·00
6. Madhupur	... ...	4·00
7. Alti	... ...	·54
8. Naltigur	... ...	·26
9. Darpan	... ...	5·53
10. Dompara	... ...	1·00
Total	...	46·00

The hilly area given above, which can only be regarded as approximate, is very small as compared with the total area of the district, comprising but a little over one per cent. of this area. Many of the hills are very interesting to antiquarians, and have been fully described by Dr. Hunter in his Statistical Account of the district. They are all very low, none of them exceeding an elevation of 2,500 feet.

SECTION 4.—*River system.*

The most striking feature in the general aspect of the Cuttack district is its system of rivers, which issue by three gorges through the hills which form its western boundary. In the south, the Mahanadi with its branch, the Katjuri, issues into the delta through Naraj, situated about seven miles west of Cuttack. North of this enters the Brahmani, and further north again, as far north of the Brahmani as the Mahanadi is south of the Brahmani, the Baitarani passes down into the delta forming the northern boundary of the district. The following table gives the names of the principal branches of these rivers, and shows where they discharge their waters:—

LIST OF RIVERS.

Names of rivers.	Where discharged.
(1) *Mahanadi*—	
Mahanadi	Into the Bay of Bengal.
Birupa	„ Brahmani river.
Burra Genguti	„ Kelo river.
Suk Paika	„ Mahanadi.
Chitartala	„ „
Nun	„ „
(1*a*) *Katjuri**—	
Katjuri	„ „
Koyakhai	„ Chilka Lake and Bay of Bengal.
Surua	„ Katjuri river.
Devi	„ Bay of Bengal.
Burra Alanka	„ Jotdar.
Chota Alanka	„ Devi.
(2) *Brahmani*—	
Brahmani	„ Bay of Bengal.
Patiya	„ Brahmani river.
Kharsua	„ „ „
Dhudhi Nadi	„ „ „
Kania „	„ Beluria.
Kelo Kimiria	„ Birupa.
Chota Brahmani ...	„ Jambu.
Gandakia river ...	„ „
Gobri river, a drainage and affluent of Gandakia ...	„ Gandakia.
Beluria river ...	„ Kharsua.
(3) *Baitarani*—	
Baitarani	„ Brahmani.
Bura	„ Kharsua.
Kianali	„ „

The Katjuri and its tributaries.—Beginning with the rivers in the south of the Cuttack district, and then taking them in order northwards, the first important river is the Katjuri, although originally it was most insignificant, having received its name from being crossed by a log of wood. It is really an arm of the Mahanadi, but is sufficiently large to deserve separate notice. It branches off at Naraj above the town of Cuttack, receiving in its channels a good portion of the Mahanadi waters. The head of this river is so enlarged that it cannot carry off the enormous quantity of water that is poured into it by a Mahanadi flood. According to Captain Harriss' report of 1857 on the control of the Mahanadi river, it is the "reaction of the river in clearing the rock-bound channel at Naraj" that has been "the cause of the great increase to the head of the Katjuri." An anicut has been therefore cut across its head, by means of which the water is directed off to the Mahanadi channels, which are much better able to carry off floods that may occur from time to time. This anicut unfortunately is not quite at right angles to the current, and has been the cause here of the encroachment of the river to a certain extent on the villages on its right bank.

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* The Katjuri, though only an arm of the Mahanadi, has been taken as a parent stream, it being the chief source of supply to all the Puri rivers and to a number of the Cuttack channels.

The Katjuri eventually falls into the Mahanadi at Jaipur in pargana Jhunker.

Just below the Naraj anicut is the Barang river, which formerly connected the right bank of the Katjuri with its main branch, the Koyakhai, into which it falls at a distance of about five miles from its head.

Next comes the Koyakhai, which branches off from the Katjuri opposite the town of Cuttack. It is so called because it was originally a mere hollow wherein the crows assembled to drink water (*koya*, a crow, and *khai*, a hollow). In 1858, according to Captain Harriss' report, it was only 800 feet, but since then the channel has become very much broader. It is this stream that forms the source of the Puri rivers.

The other branches of the Katjuri are the Surua, Devi, Biluakhai, and Alanka.

The Surua branches off from the Katjuri, a little below Cuttack, and then again joins it at Barara, after describing a course of about 10 miles. Its bed is deeper than that of the Katjuri.

The Devi throws off many branches in its course, viz.—

(*a*) The Kandal.
(*b*) The Bharya Komma.
(*c*) The Dhohikhai.
(*d*) The Purana Devi.
(*e*) The Ghordhua.
(*f*) The Gabira.
(*g*) The Khandia.
(*h*) The Goda and several minor channels, which all join each other again and flow as a large river, the Devi, into the Bay of Bengal.

This river is navigable up to Machhgaon by sloops which come there for oil-seeds and rice. It is one of the best tidal channels in Orissa, and always has a good depth of water at its mouth.

The Bilukhai branches off from the Katjuri and falls into the Devi. The Alanka branches off from the Katjuri as one stream, and then breaks up into two branches, respectively known as the Burra and Chota Alanka rivers. There is a long ride of high lying land all along its course up to the point of bifurcation. The two branches fall into the Jotdar.

The Mahanadi and its tributaries.—The Mahanadi is the *great river* of Cuttack, and in fact the largest river in Orissa. Taking its rise in the mountainous regions of the Central Provinces, it runs in a northerly direction as far as a place called Sheonarain, where it is joined by several affluents. It now runs an eastward course, and after receiving some more feeders winds southward into a series of rocks; emerging from there it flows past Sambalpur, and again takes an easterly direction below Sonepur, now winding a most tortuous way between ridges and crags, until it enters the mountains by a gorge "slightly inferior in grandeur, but equal in beauty to the gorge of the Godaveri." Issuing from thence, it expands its bed, and again narrowing descends through Naraj over the plains to the sea. Its whole length is 529 miles, and its length from Naraj to the sea, as estimated by Captain Harriss, is 67½ miles.

It is notorious for its enormous floods, and there is scarcely a geography or history of India which does not make mention of the immense volume of water which flows over its bed during such floods. Mr. Taylor says:—"A larger volume of water is discharged per second during a maximum flood through the gorge at Naraj, by which the river flows into the Cuttack delta, than is brought down during floods in the Ganges when at their highest, and it is not surprising, therefore, to find that its channels are insufficient to carry off all this excess of water. Major Harriss' calculations show that the channels of the Mahanadi and its branches can only carry off half a maximum flood without destructively inundating the country. Thus, while the river dashes down 1,800,000 cubic feet per second in full flood, all its tributaries or rather distributaries in the whole Orissa Division can only discharge 897,449 cubic feet, so that only half of the flood finds an outlet to the sea, and the other half, rising above its banks, spreads over the whole country.

The cause of the insufficiency of the channels of the Mahanadi and its branches to carry off high floods has been attributed by Mr. Taylor to the silting up of the channels brought about by the enlargement of the head of the Katjuri and by the decreased currents passing down their courses. It is when the river reaches the level delta that it finds its current checked. Winding through mountainous tracts, the rapidity which it here acquires brings down a large quantity of silt in suspension, and as it now flows on to the sea, the further it goes, the more sluggish it becomes. The land changes from a broken hilly region to a level delta, and the river is no longer able to carry all its sand, which it now deposits in the bed of its channel. The bed is thus gradually raised, and the river begins to flow at a much higher level than the surrounding country. The central portion rises more rapidly than the banks, and the channel of the river gradually gets shallower. The distributaries of the main river have their beds raised in the same way; and the result is that by degrees the Mahanadi and its channels become more and more inefficient to carry off the water-supply to the sea, and in the rainy season these high level canals are quite inadequate, therefore, to furnish any outlet for the water poured into them at their heads.

The Mahanadi gives off the Birupa immediately below Cuttack, which in its turn, after giving off the Chota Genguti and the Burra Genguti and receiving the waters brought down again by these streams and by the Kalua, a tributary of the Brahmani, discharges itself finally into the Brahmani at Indpur. The Suknai formerly flowed from the Mahanadi into the Birupa, and is now made a drainage channel. A little beyond the point where the Birupa is given off, the Mahanadi is crossed by an anicut at Jobra. Further on, at Aitpur, the Suk Paika branches off, and again pour its waters into the parent stream. The land which is thus enclosed by the Suk Paika and the Mahanadi is very sandy, and is subject to droughts in the dry season. On the left bank of the Mahanadi, below the Birupa, there are two large branches, viz., the Nun and the Chitartala proper, which are really bifurcations of the stream of the latter name. The two branches again meet at Marsaghai, where the Nun is further joined by the Kendrapara Canal. The Nun, which is the deepest channel of the Mahanadi, gives off the Bhagini, Bhundaria, and Patanai, which join each other and pour their combined waters into the Chitartala further down its course.

Near Dealpara, the Chitartala is connected with the Gandakia river, which, further strengthened by a tidal creek starting from Bolpara, flows subsequently as the Jambu.

Further down, the Mahanadi gives off a small channel known as the Kania Nadi, which falls into the parent stream at the point where the Paika branches off. This latter tributary again falls into the Mahanadi at Tikri, giving off only one small creek known as the Patnali.

Below the point where the Chitartala joins it, the Mahanadi pursues its course through thick jungles, giving off a few insignificant streams, such as the Bakud.

The Brahmani and its tributaries.—The third great river of the Cuttack district is the Brahmani, which enters the Cuttack delta from the Tributary States between the hills of killas Madhupur and Sukinda. Like the Mahanadi, it is also subject to high floods. Its two main tributaries on the right bank are the Kimiria and the Chota Brahmani.

The Kimiria branches off at Dharamsala and discharges itself into the Birupa, after receiving the waters of the Genguti. It also receives all the drainage from the hills.

The Chota Brahmani emerges from the Brahmani at Patamundi, and flows into the Jambu in a southerly direction. Besides the Chota Brahmani proper, it may be further subdivided into the Gandakia, Chedra, and Baba Jor. It is the first of these which, after receiving the Gobri, further south changes its name into Jambu, and finally falls into the Bay at False Point.

Tracing the course of the Brahmani beyond Patamundi, the first tributary of any importance is the Maipara river, which leaves the Brahmani a little below Hansua, and then pursues its course through dense jungles, discharging itself into the Bay at Point Palmyras.

The Brahmani after leaving off the Maipara is joined further on by the Baitarani river, and then flowing in a large channel discharges itself into the sea under the name of the Dhamra river.

Taking next the tributaries on the left bank of the Brahmani, the first channel of any importance is the Kharsua.

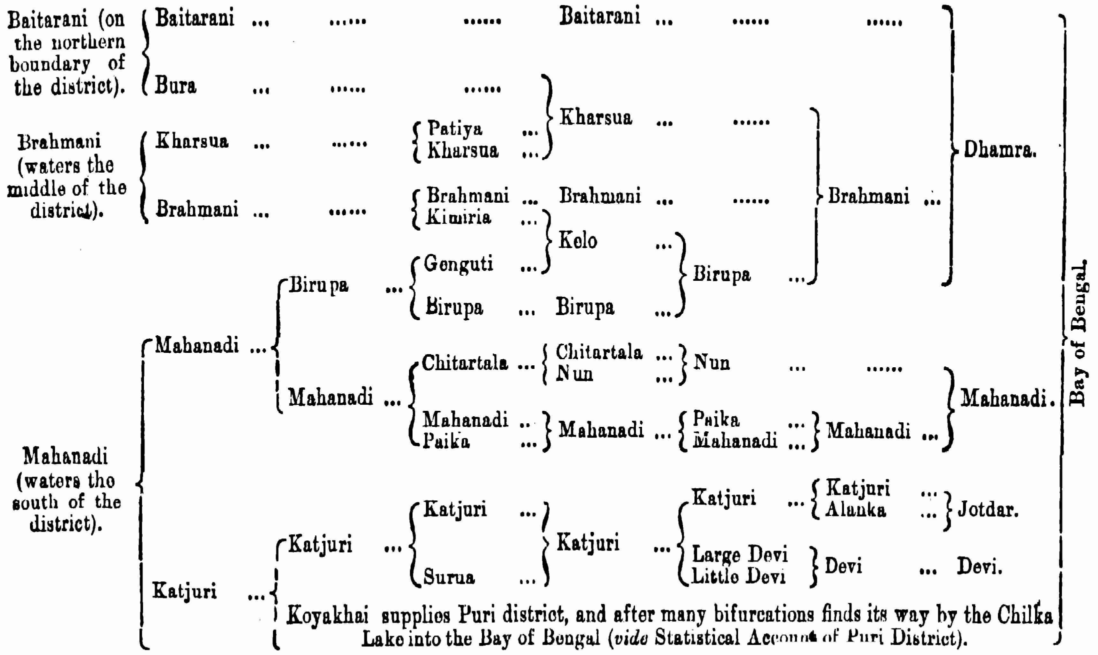
The Kharsua branches off from the Brahmani above Jubbra, and again discharges itself into the Brahmani between Rajbari and Hansua. At Baroari it receives a tributary flowing in from the Baitarani, viz., the Bura. The Bengah, the Madagoni, the Magura, and Junai are other channels which connect the Baitarani and the Kharsua.

The Baitarani enters the district from Keunjhar in a fine channel, until just below the road going to Balasore it throws off the Bura from its right bank. It then bifurcates into the Genguti and Baitarani, which branches again join at Jajpur. Several of its tributaries receive the waters of the Balasore district, but the main stream itself passes through Chandbali, and then in junction with the Brahmani, as has been already mentioned, flows into the Bay of Bengal as the Dhamra river.

The above is intended to give a general idea of the river system of the district, which brings down the accumulated waters of Central India. The drainage thus of 57,000 square miles of an inner tableland is received in four deltaic channels, and the velocity with which the waters rush down necessarily over-taxes the holding capacity of these channels to such an extent that the main rivers break up into a hundred distributaries, which, by roaming all over the delta by innumerable contortions and convolutions, form a bewildering network of streams, which, after further minor interlacings and bifurcations and combinations, discharge themselves finally into the parent channels as they fall into the sea.

The following table, taken from volume XVIII of the Statistical Account of Bengal, will, to a certain extent, illustrate the nature of some of these twisting and wandering ramifications:—

The River system of the Cuttack District.


Baitarani (on the northern boundary of the district).
Baitarani ... . Baitarani ... .
Bura ... .
Brahmani (waters the middle of the district).
Kharsua ... .
Patiya ...
Kharsua ...
Kharsua ... .
Brahmani ... .
Brahmani ...
Kimiria ...
Brahmani ... .
Brahmani ...
Dhamra.
Kelo ...
Genguti ...
Birupa ...
Birupa ... Birupa ...
Birupa ...
Mahanadi ...
Chitartala ...
Chitartala ...
Nun ...
Nun ... .
Mahanadi ...
Mahanadi ..
Paika ...
Mahanadi ...
Paika ...
Mahanadi ...
Mahanadi ...
Mahanadi.
Mahanadi (waters the south of the district).
Katjuri ...
Katjuri ...
Surua ...
Katjuri ...
Katjuri ...
Katjuri ...
Alanka ...
Jotdar.
Large Devi
Little Devi
Devi ... Devi.
Katjuri ...
Koyakhai supplies Puri district, and after many bifurcations finds its way by the Chilka Lake into the Bay of Bengal (*vide* Statistical Account of Puri District).
Bay of Bengal.

Changes in the course of the rivers.—The principal rivers which have been affected in their course by the construction of canals and embankments are the Cross Katjuri, Chota Genguti, Alanka, Chota Brahmani, Jambu, and the Suk Paika.

Lakes and marshes.—There are no lakes in the district, and no marshes worthy of any notice.

SECTION 4A.—*Canals and Embankments.*

Canals are used both for the purposes of navigation and irrigation in Cuttack, and as such may well come under Chapters III and V of the Report, but, like the embankments of the district, they are so closely connected with its rivers, that I have thought it best to treat of them here in a supplementary section.

History of the Orissa Canals.—Colonel Cotton was the first to suggest the construction of an elaborate system of canals as the only remedy against the droughts and floods to which the district was subject. His scheme, as would appear from his excellent report on the river Mahanadi, included the following works:—

(1) Weirs across the Mahanadi, Brahmani, and Baitarani rivers.
(2) Irrigating channels, completed for navigation throughout the whole delta tract.
(3) Drainage channels.
(4) Embankments to all the rivers.
(5) A high level canal for navigation to Calcutta, which would also irrigate extensively.

The Madras Irrigation and Canal Company in 1858 agreed to put Colonel Cotton's project into execution, provided the Government guaranteed interest on the capital. This, however, fell through, and it was not till 1862, when the necessity became patent of protecting the country from famine and flood, that Government entered into a compact with a new Company, known as the East Indian Irrigation Company. This Company offered to undertake the execution of a large scheme of irrigation works which was to cut through every part of Orissa, and which was to serve the threefold object of preventing the recurrence of drought, of protecting the harvest from floods, and of opening up communications. The proposal on the part of the Company to undertake the work with an unguaranteed capital was accepted by Government, and the project accordingly commenced being put into execution, water being available for irrigation at the end of the year 1865. The Company, however, found itself unable to cope with the task laid before it, and the irrigation works had to be made over to Government in the year 1868. The region over which it was originally intended that the operations should extend, reached from the Chilka lake in the south of the Puri district to the Salindi in Balasore; but the area to be irrigated, as at present designed and estimated for, takes no account of the Puri district, extending from the Salindi river on the north to the left bank of the Katjuri and its branches on the south. In the district of Cuttack itself, the ground covered by these works is traversed by the three great deltaic rivers, the Baitarani, Brahmani, and Mahanadi, and their branches, and is, generally speaking, quite flat with a staple crop of rice. The canals themselves branch off from Cuttack in directions north, south and east, so that the four sides of the delta thus covered enclose a square, of which the northern boundary is the Baitarani, the western the High Level Canal, the southern the Machhgaon Canal, the eastern the Bay of Bengal, while the Kendrapara Canal may be said to form the diagonal of the square.

Water-supply.—The supply of water for the district is chiefly derived from the three large rivers mentioned above, which bring down a very large quantity of water during the rains, but have a very small discharge during the dry season. In order to mitigate the evils that arise from this irregular supply, canals have been cut, in which the necessary supply for irrigation and navigation is maintained at all seasons of the year by the construction of weirs at their heads. There are seven such important weirs, viz., the Naraj, Mahanadi and Birupa weirs on the Mahanadi; the Brahmani and Patiya weirs on the Brahmani, and the Baitarani and Bura weirs on the Baitarani, in the district of Balasore.

An account of the weirs of the Cuttack district, together with the purpose served by each, is now given as found in a note kindly placed at my disposal by Mr. Rhind, the Superintending Engineer in charge of the Orissa Circle.

The Naraj weir.—The Naraj weir was constructed on the line of an old stone spur which was designed to regulate the quantity of water which enters the Katjuri branch of the Mahanadi at its head near Naraj above Cuttack, and so to diminsh the amount of injury done by floods in the Puri district; but it has now been found that the proportion of water which enters the Katjuri and its branches is greater than it was in the flood of 1865, so that the effect of the weir has been merely to prevent any further increase in the width of the head of the Katjuri river.

This weir leaves the right bank of the Mahanadi below Naraj and runs obliquely down stream for a length of 3,813 feet until it meets the dividing embankment which was intended to connect it with the head of the island upon which the city of Cuttack stands, but has never been completed, as it would be unsafe to do so until the length of the Naraj weir has been reduced for the long gap which at present exists in the dividing embankment above. Biranasi point serves the purpose of returning a portion of the surplus discharge of the Katjuri from that river into the Mahanadi during high floods.

There is a set of scouring sluices near the upper end of the weir, which are left fully open during the whole of the flood season, but are closed by means of timber bulks when the river falls, so that during the dry months of the year almost the whole quantity of water which comes down from the hills is turned into the Mahanadi branch, and goes to feed the canals, which are taken off above the Mahanadi and Birupa weirs lower down the river.

The Mahanadi weir.—The Mahanadi weir has been constructed across the head of the branch of that name, at the village of Jobra immediately below Cuttack, and supplies water to the Taldanda Canal and its branch the Machhgaon Canal.

It has a length of 6,346 feet between its abutments, and is pierced with two sets of scouring sluices, one of which has been placed at the south end of the weir, in order to prevent any accumulation of sand in front of the head sluices of the canal and the entrance to the Jobra lock, while the other is situated near the centre of the work, and serves the purpose of keeping a deep water channel open for navigation in the pool above the weir, which would otherwise be obstructed by sand banks.

The south shore sluices have a large number of narrow openings, which are closed when required by means of sliding shutters worked by hand labour, but the centre sluices consist of six large bays, separated by their masonry piers, which are fitted with double sets of folding shutters in the French system. These folding shutters lie flat on the floor of the sluices during the flood season, one set falling up stream and the other down stream, and are closed when necessary by the up-stream set being raised by the current passing through the bays, when they are released from the hooks which hold them down at the floor level.

The Birupa weir.—The Birupa weir is situated on the branch of that name (which leaves the Mahanadi river on its left bank, opposite to Cuttack) at a distance of about one-and-two-third miles below the head of the branch, and it has its crest fixed at a level of one foot below that of the Mahanadi weir, in order to induce a stronger flow of water down the Birupa, and so prevent the head of that branch from silting up.

The length of this weir is 1,980 feet between its masonry abutments, and it is furnished with two sets of under-sluices, one of which, namely that at the left bank, has a number of narrow openings, closed by means of wooden shutters which slide in vertical grooves cut in the masonry of the piers, while the other consists of a single wide opening, which is furnished with folding shutters similar to those which are in use at the centre sluices of the Mahanadi weirs.

This powerful sluice is situated at the right flank of the weir at Jagatpur, and is intended to prevent any sand from accumulating in the bed of the river in the front of the head sluices and head lock of the Kendrapara Canal, which is taken off from the Birupa at this point. The set of scouring sluices which is situated at the left flank of the weir renders a similar service to the feeding sluices and entrance lock of the first range of the High Level Canal, which leaves the Birupa on its left bank at Chowdwar.

In addition to the folding and sliding shutters which are required for the purpose of closing the under-sluices, each of the Mahanadi and Birupa weirs has a line of folding shutters on its crest, which are used during moderate floods, and during the cold and dry seasons of the year, to raise the water level in the pools above the weirs to the height which is necessary for irrigation and navigation. These folding shutters have a height of three-and-a-quarter feet in the case of the Mahanadi weir, and those on the crest of the Birupa weir are one foot higher.

The three weirs on the Katjuri, Mahanadi, and Birupa are all constructed in a similar manner, and consist of a body wall of masonry, founded upon wells sunk into the sandy bed of the river, which is protected on the up-stream and down-stream sides by means of aprons of dry stone carefully packed by hand. The apron on the down-stream side of the body wall has a long slope which is divided into several parts by means of masonry walls, running parallel to the body wall and also founded upon wells. The under-sluices have a floor of solid masonry, generally resting upon well foundations, and the down-stream side of this floor is usually protected by means of a long sloping drystone apron, which is strengthened at intervals by longitudinal masonry walls.

The other four weirs upon the Brahmani and Baitarani rivers are intended to supply water to the various sections of the High Level Canal and of those on the Brahmani; one has a length of 4,000 feet, and is situated at Janapur at the outfall of the first range, while the other has been built on the Patiya branch, immediately below the outfall of the Ginda *nala*, at the head of the High Level Canal, 2nd Range. This second weir has a length of only 783 feet between the paces of its abutments.

The Brahmani weir.—The weir at Janapur has two sets of under-sluices, one at each end of the work, which are both fitted with double folding sluices, and are intended to remove the sand which would otherwise collect on the upper side of the weir and obstruct the entrance to the canal, and the weir and its sluices are similar in their construction to those which are situated upon the Mahanadi and its branches, and have already been described.

The Patiya weir.—The weir at Jokodea on the Patiya branch of the Brahmani river is, however, somewhat different in character from that at Janapur, as it consists entirely of sluices furnished with double folding French shutters, and is crossed by an iron foot-bridge resting upon masonry piers, which rise from the floor of the weir to above the highest known flood level in the river above it. On the down-stream side of the masonry floor, upon which the bridge, piers and folding shutters rest, is the usual long sloping apron of dry stonework intersected by masonry walls, which is required in order to protect the river bed from the action of the water passing through the sluices.

Main canals.—The canals which are supplied with water for irrigation and navigation by means of these seven weirs are—

(1) The High Level Canal with its two branches to Bhadrak (Balasore district) and Jajpur.

(2) The Kendrapara Canal with its extension to Jambu, and its two branches called the Patamundi and Gobri Canals.

(3) The Taldanda Canal with its branch the Machhgaon Canal.

There is also another canal, called the Gobri Extension Canal, which is supplied with water from the Kendrapara Canal by means of the Patamundi branch.

The first four miles only of the Machhgaon branch are at present capable of being used for navigation purposes, and the Patamundi Canal is unnavigable throughout its entire length, being unprovided with locks. All the other canals are open both for navigation and irrigation.

The High Level Canal.—The High Level Canal was originally designed to provide a suitable trade route between Cuttack and Calcutta, as well as to irrigate the country through which it passed; but this scheme has now been abandoned, and canal communication with Calcutta has been effected by means of a low level line called the Coast Canal, which has its outfall in the Mētai river, an affluent of the Dhamra, along which the pilgrim steamer traffic passes to the Alba lock on the Gobri Extension Canal and thence to Cuttack.

This High Level Canal, as it has been constructed, is divided into three ranges, two of which lie in the Cuttack district—the first connecting the Birupa river with the Brahmani, and through it with the Patiya branch of the latter river, and the second uniting the Patiya river with the Baitarani.

High Level Canal, 1st Range.—The first range of the canal starts from the left bank of the Birupa river above the weir, and runs along the foot of the hills in a north-easterly direction for a distance of about 33 miles, until it falls into the Brahmani river at the village of Janapur. It is divided into two reaches, the first of which has a length of about 26 miles from Chowdwar to Emamnagar, while the second is only seven miles in length and extends from Emamnagar to Janapur. There are, therefore, only three locks in this canal, viz., the head and tail locks at Chowdwar and Janapur, and a lift lock which has been built at the junction of the two reaches at Emamnagar, all of which have a length of 150 feet and a breadth of 20 feet at the points at which their gates are fixed.

The first reach of the main canal has a fall in its bed of one inch per mile, and its base has a width varying from 72 feet at the head to 35 or 40 feet at points where there are laterite rock cuttings to be passed through. The bed of the second reach below the lock at Emamnagar is level throughout its length.

This canal is crossed by permanent iron bridges suitable for cart traffic at seven points, viz., at the three locks at Chowdwar, Emamnagar, and Janapur, and at Nuntikri, Tanghi, Santipur, and Madhupur; but there are also several temporary bridges, with smaller spans and timber piers, which have been erected at various other points in order to accommodate the traffic.

The drainage water which comes down from the high ground to the left of the canal is passed under it by means of nine syphons and two large aqueducts. Four escapes have also been provided for surplus canal water.

The calculated discharge at the head of the canal at Chowdwar is 608 cubic feet per second at full supply level, and a total area of 48,815 acres is capable of being irrigated from both reaches, of which 4,085 acres are situated between the Chota and Burra Genguti branches of the Birupa, and are supplied with water by means of an extension of No. 1 Distributary which has been carried across the first-named branch on an embankment, thus completely closing its head.

The distribution of the irrigation water has been provided for by the construction of 17 distributaries, which with their branches have a total length of 114½ miles, and in addition to these, 44 village channels have been made with a joint length of about 17 miles.

High Level Canal, 2nd Range.—The second range of the canal leaves the left bank of the Patiya branch of the Brahmani river, immediately below the outfall of the Ginda *nala* and above the Patiya weir. It consists of one reach only, which has a length of nearly 12½ miles.

Entrance to the canal is afforded by the head lock at Jokodea, which has a length of 150 feet and a width of 20 feet. Vessels pass out into the Baitarani river at Rorya above the Bura weir by means of another lock of similar dimensions.

There are three iron cart bridges across the canal, two of which are situated at the head and outfall locks, while the other is at Hatsai in the eighth mile. Provision has been made for crossing the drainage water under the canal by means of five aqueducts and four syphon culverts.

The width of the bed of this range is 88 feet, and its depth of water when at full supply level is 8 feet, so that, with the existing fall in the bed of one inch per mile, it is capable of carrying a discharge of 728 cubic feet per second and irrigating an area of 72,800 acres of land; but the area actually under command of this canal is only 10,000 acres, and as it is exposed to the action of the floods of the Bura and Kharsua rivers, no distributaries have been provided for in the sanctioned estimates of the project, and none have therefore been constructed in connection with this canal.

The Jajpur Canal.—The Jaipur Canal has a length of six-and-a-half miles, and extends from the village of Malandpur, which is situated at the bifurcation of the Baitarani and Bura rivers along the right bank of the Baitarani to the bank of the Kiah *nala*, a small branch of the Baitarani, which leaves the parent stream close to the town of Jajpur.

This canal has at present only one masonry wall upon it, viz., the entrance lock at Malandpur.

It has a base width of 35 feet and a depth of 8 feet at full supply level. The slope of its bed is one foot in 10,000, so that it is capable of carrying a discharge of 812 cubic feet per second, if required for irrigation purposes. The canal is only navigable by country boats, as the depth of water which can be maintained upon the sill of the lock at still water level is only three feet.

The area under command of the canal lies between the Baitarani, Bura, and Kharsua rivers, and provision has been made in the sanctioned estimates of the project for the construction of the necessary distributaries for the irrigation of an area of 70,000 acres, but none of these channels have yet been cut, as the detailed designs and estimates have not been completed.

The Kendrapara Canal.—The head of the Kendrapara Canal is situated upon the right bank of the Birupa above the Birupa weir, and the canal runs along the north or left bank of the Mahanadi and its branches, the Chitartala and Nun, nearly due east to Marsaghai, at which point there is an outfall lock, leading into the tidal water in the Nun river, at a short distance above the place at which it rejoins the Chitartala. The main canal from Jagatpur to Marsaghai was opened in the year 1869, and has a total length of rather more than 39 miles, of which about nine miles lie along the left bank of the Mahanadi river, nine more along the left bank of the Chitartala, and the remaining 21 miles along the left bank of the Nun river.

The canal is divided into seven reaches and has eight locks, which are situated at the villages of Jagatpur, Baruberia, Kendupatna, Lokinathpur, Danpur, Bosepur, Kulpara, and Marsaghai. The reaches have lengths of six, ten, six, four, four, five, and four miles respectively. The head lock at Jagatpur has a length of 150 feet and a width of 17 feet at the points at which the gates are fixed, but the remainder of the locks are each 100 feet in length and 17 feet in width.

There are iron road bridges at each of the first seven locks, and an iron lattice girder bridge at Kyra in the first reach of the canal, at the point at which the road leading from Cuttack to Kendrapara is crossed.

This canal is filled with water by means of a head sluice, which has fifteen arched openings, each five feet wide and eight feet high, closed by wooden shutters sliding in vertical grooves. The reduced level of the sill is 59·50 feet above mean sea level.

This sluice is capable of passing a discharge of 1,952 cubic feet per second, with a head of about four inches. The bed of the channel below it has a bottom width of 123 feet with a depth of seven feet, and side slopes of two to one, as far as the head of the Patamundi Canal, at which point the width of the base is reduced to 65 feet, and the discharge of the main canal becomes 1,067 cubic feet per second.

The slope of the bed of this canal in the first two reaches is six inches per mile. The width of the bed in the second reach is 57 feet, while in all the other reaches below Kendupatna it is only 47 feet.

Escapes for surplus water are provided in the second reach above Kendupatna, where a sluice has been constructed which is capable of discharging about 500 cubic feet per second into the Chitartala river during floods, and in the last reach at Montri below the Kulpara lock, where an escape weir and sluice passes water when required into a tidal creek to the left of the canal. A small drainage sluice discharging into the Birupa has also been constructed in the left bank of the canal, at a short distance below the head sluice, by means of which the bed at the head of the canal can be laid dry during the annual closure for repairs in the month of May. The Kendrapara Canal is designed to carry water at its head for the irrigation of 212,650 acres, of which 83,250 acres represent the area under command of the Gobri extension and Patamundi branch, leaving 129,400 acres to be watered by the Kendrapara, Gobri, and Kendrapara extension canals.

The area commanded by the Gobri branch is 21,290 acres, and that by the Kendrapara extension is 7,000 acres, so that the Kendrapara Canal proper will only irrigate 101,110 acres of land, of which 92,982 acres are already provided with distributaries, whose total length amounts to 357 miles inclusive of village channels.

The remaining area is to be irrigated by two additional distributaries and their branches.

The Kendrapara Extension Canal.—The Kendrapara Extension Canal is a continuation of the Kendrapara Canal, and runs between Marsaghai and the Jambu rivers, a distance of fifteen miles. It was principally constructed with the object of improving the communication between Cuttack and False Point Harbour into which the Jambu flows, but it is also capable of supplying water for irrigation purposes to a small area of 7,000 acres of land which is situated to the left of the canal, and between it and the Jambu river.

The canal consists of a single still-water reach, and has only three masonry works upon it, viz., a lift lock and weir, which are situated at Marsaghai at a short distance from the tidal lock at that place, and an outfall lock at the entrance from the Jambu river. The lock at Marsaghai is similar in point of size to the others in the Kendrapara Canal, being 100 feet in length and 17 feet in width, but the outfall lock at Jambu has been constructed with a length of 150 feet and a width of 20 feet. No distributaries have as yet been made in connection with this canal.

The Patamundi Canal.—The Patamundi Canal is a large branch which leaves the Kendrapara Canal in the first reach at a short distance below its head at Jagatpur and runs along the right banks of the Birupa and Brahmani rivers to the village of Patamundi, which is situated on the Brahmani at a distance of about 47 miles below the head of the branch.

It was originally intended to render this canal navigable throughout its length, and sites for the necessary locks were accordingly left near the falls which have been built upon it; but the cost of these navigation works is not included in the project as at present sanctioned, and it is improbable that they will ever be constructed, so that the canal may now be looked upon as a purely irrigation work.

At the head of the canal there is a supplying sluice, which has six openings, each 5 feet in width, and 5 feet higher to the springing of the arches, closed by shutters sliding in vertical grooves. This head is capable of passing the discharge of 885 square feet per second, which is carried by the reach of the canal when following at full supply level with a head of about 10 inches.

The canal has four reaches, which are separated by three masonry weirs, across each of which there is an iron lattice girder bridge suitable for the passage of carts. The weirs are situated at the villages of Ramessur, Ballichunderpur, and Charpara, at distances, respectively, of 9½, 22¾, and 34¾ miles from the head of the branch.

The base of the canal varies in width from 50 feet in the first reach to 45 feet in the fourth, and the depth of water at full supply is 6 feet in the first three reaches and 7 feet in the last, while the slope of the bed is one foot per mile in the first and second reaches, nine inches per mile in the third, and four inches per mile in the fourth. The slopes of the sides are two to one throughout the entire length.

The Indpur road is carried across the last reach of the canal, at a distance of about 36 miles from the head, by means of an iron lattice girder bridge, and the only other masonry works now in existence upon this canal are the syphon culverts which were constructed for the purpose of passing drainage water under the canal from the river to the country side, and some of the distributary head sluices. There was formerly an escape at the end of the canal near Patamundi, but this was accidentally destroyed, and it is now intended to pass the surplus canal water forward into the Gobri Extension Canal, and to build a new escape there at Gunpur.

The head of the canal carries water for the irrigation of an area of 83,250 acres, of which 51,250 acres are situated upon this canal, and the remaining 32,000 acres upon the Gobri Extension Canal, which forms a continuation of it. The distribution of the water to the area of 51,250 acres belonging to the Patamundi Canal will be effected by means of eleven main distributaries, with a total length of about 108 miles inclusive of branches, of which two main distributaries, whose total length inclusive of their branches amount to about 33¼ miles, have already been completed.

The Gobri Extension Canal.—The Gobri Extension Canal has a length of about six miles, and runs from the left bank of the Gandakia river, at the village of Lokinathpur, opposite to the outfall lock of the Gobri branch, to the right bank of the Brahmani river at the village of Alba, a short distance below Patamundi.

It has no connection with the Gobri branch, but is supplied with water for navigation and irrigation by means of a feeding channel, which forms an extension of the Patamundi Canal and joins the Gobri Extension Canal in the neighbourhood of the Alba lock. The length of the feeding channel is about two-and-a-half miles, and it is navigable by boats and steamers as far as the fall at Patamundi, which has been built at the lower end of the fourth reach of the Patamundi Canal and serves to regulate the quantity of water to be admitted to the feeding channel and Gobri Extension Canal.

The bed of the main canal is level throughout with a base width of 60 feet and side slopes of two to one. The depth of water at full supply level is seven feet.

There are two tidal locks upon the main canal, which are situated at Lokinathpur and Alba respectively, on the Gandakia and Brahmani rivers. The former has a length of 100 feet with a width of 17 feet, while the latter has the same width, but is somewhat longer, and is fitted with a double set of lock-gates, in order to admit of the passage of vessels in both directions when the Brahmani river is in flood. The other masonry works upon this canal are the weir at Patamundi, which has an overfall 36 feet in length, and is founded upon wells, a small escape and rapid situated near the point at which the main canal crosses the Chota Brahmani river, a small syphon culvert under the main canal near the village of Alba, and three head sluices for distributaries on the right bank of the main canal.

As already stated, the area which is under the command of the Gobri Extension Canal amounts in all to 32,000 acres, for which the necessary water is supplied by the Patamundi Canal, and of this about 12,000 acres are situated upon the island which is bounded by the Chota Brahmani, Gandakia, and Jambu rivers, while the remaining 20,000 acres lie between the Chota Brahmani and Brahmani, and will be watered partly from the main canal, and partly from its feeding channel. There have been no distributaries yet constructed in connection with this canal.

The Gobri Canal.—The Gobri Canal was originally intended to be a distributary of the Kendrapara Canal, but was afterwards rendered navigable by steamers and boats in order to facilitate communication between Cuttack and the port of Chandbali on the Baitarani river in the district of Balasore. It leaves the Kendrapara Canal on its left bank at a distance of about 28 miles below its head, and after passing through the town of Kendrapara terminates at the right bank of the Gandakia river, at a short distance below the outfall of the Gobri drainage line, from which it takes its present name.

The length of this branch is about 15 miles. It is divided into three reaches, each of which is terminated by a lift lock with a length of 100 feet and width of 17 feet. One of these locks is situated at Chokorda, at a distance of about two miles below the offtake from the Kendrapara Canal, and another has been built at the town of Kendrapara, while the third is the tidal lock at the outfall into the Gandakia river.

There are two lattice girder bridges at Chokorda, Kendrapara, and an iron road bridge at Santsai below Kendrapara. There are also some small syphons for passing drainage water under the canal.

The area of culturable land which is capable of being irrigated from this branch canal amounts to 21,290 acres, and provision has been made for the construction of 60 miles of main and branch distributaries, for which the necessary surveys have been completed and detailed plans and estimates drawn up.

The Taldanda Canal.—The Taldanda Canal has been designed for the purpose of irrigating the triangular tract of country which lies between the Mahanadi and Katjuri rivers. Its head is situated on the right bank of the Mahanadi at the village of Jobra above the Mahanadi weir. The main canal first runs southward, to the east of the city of Cuttack, for a distance of about a-mile-and-a-half, and it then turns to the eastward and runs midway between the Katjuri and Mahanadi for three miles more, after which it keeps nearly parallel to the Mahanadi, at a distance of from half a mile to one mile from its right bank, until it reaches the village of Berabati, which is situated at a distance of seven miles from the head of the canal.

At this point the canal throws off a large branch called the Machhgaon Canal, and the main line then follows the right bank of the Suk Paika, a minor branch of the Mahanadi, and of the Mahanadi itself to its termination at Paradip.

The main canal is divided into six reaches by means of five lift-locks which have been built at the villages of Berabati, Sompur, Taharpur, Tirtole, and

Taldanda, at distances respectively of about 7, 15, 25¾, 34¼, and 43½ miles from the head of the canal at Jobra. The width of the base is 64 feet in the first reach, above the offtake of the Machhgaon Canal, and below that point it is 32 feet in all the reaches. The depth of water at full supply level is 8 feet in the first reach and 7 feet in all the rest, and the fall of the bed is in all cases six inches per mile, except in the last reach above the Paradip lock, where it has been reduced to 1·39 inches per mile.

The head lock at Jobra is 150 feet long and 20 feet wide, but all the lift-locks have chambers 100 feet long and 17 feet wide. The outfall lock at Paradip, which has only been recently commenced, will be of the same dimensions as the other lift-locks.

This canal is supplied with water for irrigation and navigation by means of a head sluice which has 15 openings, each 6 feet wide and 8 feet high. The discharge of the canal in the first reach is 1,342 cubic feet per second, but below the Berabati lock it is reduced to 566 cubic feet on account of the quantity of water which is withdrawn at that point by the Machhgaon Canal. The cart traffic is accommodated by iron lattice girder and stone bridges at the various locks, and by three arched stone bridges which have been built at certain points in the first reach in order to carry the important roads across the canal. In addition, an escape and rapid has been erected at Harishpur for the discharge of surplus water. This surplus canal water first enters the Hansua drainage line and is then carried off by the main drainage cut between the Taldanda and Machhgaon canals to the sea.

The passage of drainage water under the canals is provided for by means of five small syphon culverts.

The Taldanda Canal has been designed to carry water for the irrigation of 178,486 culturable acres, of which 75,278 acres are intended to be watered from the main canal, and 103,208 acres from the Machhgaon branch.

The sanctioned estimates for the Taldanda Canal provide for the construction of about 353 miles of main and branch distributaries, which will be necessary for the irrigation of the area of the above 75,278 acres, and of these ten main distributaries which, with their branches, have a total length of about 71½ miles and supply water to an area of 15,250 acres, have already been constructed.

The total length of this canal, when fully completed, will be 51¾ miles, and of this about 31 miles have been finished and are now open for navigation, while the earthwork of the remainder is well advanced.

The distributaries which have not as yet been constructed will be in connection with the last three reaches of the canal, between Taharpur and Paradip.

The Machhgaon Canal.—The Machhgaon Branch Canal leaves the Taldanda Canal on its right bank at Berabati, seven miles from the head at Jobra, and follows the left bank of the Katjuri and its branch the Alanka, closing on its way the heads of the *cross* Katjuri branch, which formerly had its outfall at Jaipur on the right bank of the Mahanadi, and of the Burra Alanka, a minor branch of the Alanka river.

This canal as sanctioned was to have had its termination in the Muggra *nala*, by which it would have been connected with tidal water in the Devi river; but it has since been decided only to carry the canal for the present as far as the end of the fifth reach, which is just beyond the 32nd milestone near the village of Nalia.

The total length of the canal as originally proposed was about 39¾ miles.

It was at first intended that the canal should be navigable throughout its entire length, and provision for the necessary locks was made in the sanctioned estimate; but the construction of these navigation works has been postponed, so that the last four reaches of the canal can at present only be used for irrigation purposes.

As originally designed and constructed, the first 19 miles of this canal had a base width of 40 feet, and a fall in the bed of one foot per mile; but this heavy slope was found to be inconvenient for irrigation, and this part of the canal was afterwards remodelled, so as to reduce the slope of the water surface to six inches per mile.

Between the 19th mile and the present termination of the canal, the slope of the bed has been made six inches per mile, and the width of the base is 32 feet, while the depth of water at full supply is 7 feet.

The masonry works upon this branch will ultimately consist of seven locks, of which one only, viz., that at Berabati, has yet been built, and six regulating weirs, of which four have already been completed.

There will also be two escapes for surplus water, one of which is situated at Nowada in the second reach, and is capable of discharging about 456 cubic feet per second, while the other is being constructed at Nalia, at the present lower end of the canal, and is calculated to pass an additional quantity of 338 cubic feet when required. In addition to these large masonry works, two small syphon culverts have been built, in order to pass drainage water underneath the canal.

The discharge allotted to the Machhgaon Branch Canal is 776 cubic feet per second, and the total area which it is intended to irrigate from it is 103,208 acres of culturable land, of which 26,606 acres are situated between the Alanka and Devi branches of the Katjuri river to the right of the canal, while the remainder lies on the left bank.

Remarks and suggestions.—The advantages of irrigation to a district like Cuttack were put forth about half a century ago by no less an authority than Mr. Moffat Mills, who was then one of the Commissioners for Cuttack. At the present day, their utility can hardly be questioned in spite of the complaints made by the raiyats with regard to the rates they have to pay for this irrigating water. From Appendix X an idea will be obtained of the extent of the canals and their distributaries constructed for irrigation purposes, from which it will be seen that they are designed to irrigate 519,951 acres of land, a little less than one-fourth of the total area of the district. The embankments of the canals further serve to protect the land from inundation. It must be remembered that there is nothing in this world which is a source of unmixed blessing, and the canal system not being an exception to the rule, has its disadvantages. The raiyats formerly used to obtain their water free of cost from the many *jhores* or creeks which traversed their lands; these have now been lost to them, being taken up by canals and distributary channels, for the water of which payment is taken from them. The embankments of the canals (and of the rivers as well) now prevent a large amount of silt being deposited on the land, so that in many parts of the district, crops such as wheat, mustard, *mung*, &c., have suffered to such an extent that their cultivation has had to be abandoned. These after all, however, are incidental drawbacks, not to be compared to the counterbalancing benefits to be derived from the protection of the country from drought and inundation. Instead of being left to the mercy of irresistible torrents which swept away all that lay in their way, the cultivator can now confidently rely on an outturn, however small, as a return for all his labour. He has further the satisfaction of knowing that within his reach there is a plentiful supply of clean bathing water and wholesome drinking water, which to him are not mere luxuries, but preventives against epidemics which in so many cases arise solely from the use of filthy and contaminated water. To the raiyat, who is doomed to eke out his existence in saliferous tracts, pure fresh water becomes a twofold blessing. Experiments by the Public Works Department seem to point to irrigation with canal water having increased the outturn of the rice crop of the raiyats. Experiments with paddy on irrigated and unirrigated lands show that during the five years 1885—90 there was an average net profit in the former of Rs. 3·258 per acre after deducting the water-rate (*vide* Appendix X). Besides conferring these immediate benefits on the raiyats, the canals have done much for them by opening up the whole district. Before the commencement of the irrigation works, the price of rice was much lower than it is now. When the Uryas began to see that with new facilities of communication their produce could be sold off at profitable rates in distant markets, from self-feeders they became more of traders. The impetus thus given to trade has contributed much towards the comparative advancement of the district.

The utility of canal water *per se* being thus established, the real difficulty lies in the satisfactory organization of the Irrigation Department and in proper adjustment of the water-rates.

The attitude of the raiyats to irrigation has been anything but friendly. Complaints are often being raised of illegal proceedings and oppression on the part of the subordinate officers of the Department; but it is difficult to say how much weight should be attached to such grievances, as the raiyats cannot be said to be clean in their own proceedings, all kinds of subterfuges being employed by them to avoid payment, if possible. Then, again, very justly, complaints are evoked on account of the enhancement of rent of irrigated lands by the zamindar, who, paying nothing towards the water-rate, practically appropriates the increase due to irrigation.

The question of the water-rate itself is one which presents immense difficulties from the variety of interests concerned, and whatever system may be adopted, there will necessarily be a hue-and-cry raised. It is, however, not to be forgotten that the Government of the country has incurred an enormous expenditure to give water benefits to the district at large, and as members of a body corporate it is incumbent upon every individual to lighten the burden of his neighbour by taking a share of that burden upon his own shoulders. To say that those alone who take the water for their fields have been the sole persons to enjoy the benefits of irrigation works is to take a very narrow view of the question in which all the collateral advantages of good water and ready communication are thoroughly ignored. All profit by the system, and therefore all should pay, and a compulsory water-rate is one which may therefore be advocated very justly. It would be fair on abstract principles, and in actual practice ought to be received with favour by the people. The rate itself would necessarily decrease, whereas, on the other hand, the Government revenue would perhaps increase. It may not be pushed on the people as a new tax, the very sound of which will be a terror and bugbear to all, but in the coming settlement it may well be included in the *jama*, care being taken that the rate is always assessed with the greatest consideration. Such an increase in the assessment would fall imperceptibly on the people, and the huge machinery now at work to see to the execution of leases, &c., would be spared an immense amount of labour, leading to a very considerable diminution in the expenditure of the irrigation establishment.

Embankments.

From early records it appears that the inhabitants of Orissa were alive to the importance of keeping up embankments, the cost of which was always included in the *jama* payable by zamindars, and at the close of every year a certain deduction was made by Government from the *jama* on account of the repairs executed by the zamindars during the year. That the country required such protection was also the opinion of Mr. Mills, who in his well-known Minute on the settlement of Orissa has the following remarks in connection with this subject:—

"The Province of Cuttack, being intersected with rivers and mountain torrents, is peculiarly liable to inundation; the *bunds* which have been constructed from time to time with a view to protect the lands from inundation, and thereby improve and extend cultivation, have become works of magnitude and importance, and of course are a source of heavy expenditure to Government. It is said that embankments in the long run are productive of far more mischief than good; that the beds of rivers are gradually raised above the level of the surrounding country; and though the bunds afford protection in ordinary cases, yet when they do give way they cause the most appalling losses. The system has too long prevailed to admit of so sweeping a remedy as the levelling of all the *bunds*; while it is impossible to estimate what would be the consequence of such a measure."

These defensive works, which have existed from time immemorial to protect the deltaic lands against the immense volume of water issuing from the mountainous tracts of the west, are still kept up by Government in order—

(*a*) To preserve the land from the encroachment of water.
(*b*) To help in the irrigation of lands by retaining fresh water.
(*c*) To serve as a footpath during the rains.

There are now 913 miles of Government embankments to protect the country from floods, under the charge of the Superintending Engineer of the Orissa Circle, who is also the Superintendent of Embankments. A register of these embankments, including those of the Puri Division, as obtained from the

Irrigation Manual of the Public Works Department, is given in Appendix X. Of these 119 miles are classed as capital embankments, being so called from the fact of their having been constructed at the cost of the canals and maintained from their revenue. The remaining 794 miles consist of ordinary agricultural embankments, which are maintained from the ordinary revenue of the country. These latter afford but little protection during high floods, when they are breached in various points, as was found to be the experience in the high floods of 1879 and 1885; but there have been no such serious breaches as there were in the inundation of 1866, when there were 413 breaches in the embankments of the district.

Protective embankments, on the other hand, have been really found to protect tracts which were formerly exposed to the destructive effects of floods, as will be seen from the following remarks in a letter addressed by the Public Works Department office in Cuttack to the Collector of the district:—

"The Kendrapara Extension Canal has closed the head of the Jambu river immediately below the Marsaghai lock, and its embankments serve to protect the country to the left of that canal from injury by the floods of the Mahanadi river. The head of the Chota Brahmani at Patamundi has also been closed by the flood embankment of the Gobri Extension Canal, and the embankment on the right bank of the Brahmani below the Alba lock, which protects the Utikan estate, is being raised and strengthened. A continuous flood embankment now exists on the left banks of the Birupa and Burra Genguti rivers, and the right banks of the Birupa and Brahmani are protected by means of the flood bank of the Patamundi Canal. A continuous flood embankment has also been constructed on the right bank of the Kimiria river, in connection with the High Level Canal, 1st Range.

"The small branch of the Katjuri river, which formerly flowed across from the Katjuri to the Mahanadi at Jaipur, has been closed by the extension of the Machhgaon Canal, and the head of another section of the Katjuri has also been closed below the head of the Biluakhai branch by a portion of the embankment which is now under construction in order to protect the tract of country which lies between the Devi and Alanka rivers from injury by floods. The closure of the head of the Katjuri below the head of the Biluakhai has also the effect of completely closing the Alanka branch, the floods of which formerly did a considerable amount of injury to the country situated on its banks."

Remarks and suggestions.—The delta is so small, and the mass of water brought down so enormous, that embankments will always be liable to breach, and the most expensive measures to control this immense discharge of water will fail to give absolute and unlimited protection. Some advocate the removal of embankments, which, in their opinion, is productive of more harm than good; but it must not be forgotten that the Cuttack rivers abound in sand which would render the land over which it would be deposited thoroughly useless, so that a permanent injury would take the place of temporary losses, and cultivated land be converted into a sandy waste. What is really necessary is the keeping of the embankments in as efficient order as possible, and even at greater expense than is done now. Embankment has been the rule in the Cuttack delta country from time immemorial, and it is now too late in the day to hope that the streams, if left unembanked, will in time raise their own banks, and so more effectually than artificial embankments protect the country from destructive floods. No doubt where no embankments exist certain areas are enriched by alluvial deposits, from which valuable crops of tobacco, mustard, and castor-oil could be raised; but these are only limited and cannot be held in any sense to compensate for the injury done to lower lands by the absence of *bunds*. The abrupt termination of the embankments, however, is an evil even greater than their complete absence, as in such cases the water is backed up by the already existing *bunds*, under which circumstances the country in the vicinity cannot but suffer great damage. To me, there appeared to exist in the district several of these unfinished *bunds*, and I am therefore strongly of opinion, should my observation be correct, that they should in every case be extended, and especially so in the saline eastern tracts of the country, where the great object is to save the land from being flooded by the tidal waters, which leave behind a deposit of salt, offering thus the greatest hindrance to the cultivation of land and the growth of crops.

CHAPTER II.

THE AGRICULTURAL POPULATION; THEIR CHARACTER AND CONDITION.

SECTION I.—*Castes engaged in Agricultural pursuits.*

In the Appendix will be found Statistics regarding the population of the district, and of the number of persons engaged in agricultural pursuits. In this Chapter is given merely a description of all the different castes which form the Hindu population of the district. A short account is inserted also of a few aboriginal tribes, which have come into Cuttack from the mountains on its western frontier. There are also a number of Muhammadans in Cuttack who are engaged in agriculture, but as the ratio they bear to the entire population is very small, no separate remarks need here be made with regard to them. Their character as agriculturists, as well as that of the few Native Christians in the district, will be found discussed in Section 2 of this Chapter.

Hindus—(1) *Brahmans.*—(*a*) *The Odeo Brahmans* form one of the ten original races of Saca Dwipa Brahmanás. They are engaged in officiating at sacrifices, in reading and teaching the Vedas, and hence they belong to the great class of Vaidik Brahmans. The remuneration obtained from these offices together with the charity which they receive form their regular means of subsistence. Stirling in his History of Orissa gives the following account of them:—" If they cannot gain an adequate livelihood by the regular modes, they may eat at a feast in the house of a Sudra, or receive charity from one of that class; also they may cut firewood from the hills and jungles and sell it. Should these resources fail, they may, after fasting for three days, steal a little rice from the house of a Brahman or any other, in order that the king hearing of their distress by this means, may assign something for their maintenance. Should also these expedients prove insufficient, they may engage in the duties of the Kshattrya and the Vaisya, but as soon as they have possessed a little property, they must repent and return to their original occupations."

(*b*) *The Mashtan Brahmans* are really the cultivating Brahmans, or, as Dr. Hunter calls them, the " Potato-growing Brahmans." In the district itself, they are known as *Saruo* Brahmans from the fact that they grow the *saru* (kachu). Besides *saru* they grow other vegetables, and fruits too, such as cocoanuts, which they barter in exchange for paddy. Though performing all the minor operations of cultivation, they refuse to drive the plough. Field crops are also grown by them by hired labour generally. The cultivation, however, of onions, garlic, turmeric, tobacco and other such like crops is considered degrading, and is consequently not adopted. From the fact of their engaging in kitchen gardening they are sometimes called Paniyaris. A fine distinction is sometimes made between them and those who hold the plough, who from that fact are styled *Halias.*

(*c*) *The Ganak Brahmans* form the great body of astronomers and fortune-tellers, and obtain their living mostly by begging.

(*d*) *The Devalaca Brahmans* are those attached to temples, and to the service of the gods. Closely allied to them are a large class of other Brahmans who go by different names.

(*e*) *The Pandas* serve as attendants in temples, and are especially noted for their poverty, idleness, and worthlessness. In one of the old reports of the subdivision, the officer in charge comments on the poor condition of the Pandas of Jajpur since the opening of the Chandbali route which has decreased the number of pilgrims going through that station. A part of their work is to serve as pilgrim recruiters, and though able-bodied men they would rather starve than put their hand to cultivation. In very many villages are to be found these pilgrim-recruiting Brahmans. Their practice is to leave their homes for a month or two, or even three or six months, and to get pilgrims from all parts of India to visit the sacred shrines of Orissa. They are really the agents of the resident Pandas of the temples, getting a commission for their trouble in addition to the presents they may receive from individual pilgrims. When there is a scarcity of pilgrims, they employ their time in cultivation, though always with hired labour. Among them may be noticed the Ratha, the Kushnattri, the Bharatdaj, and the Das Brahmans. There are several classes of this caste also who, although the *purohits* of their villages, do not think it degrading to cultivate and even beg. Others, again, have set up as mahajans and money-lenders. In an agricultural report, however, it is not necessary to dilate on this part of the subject.

(2) *Rajputs* are probably the military aristocracy and the landed gentry, including some of the chiefs of the Tributary States; but menials, such as *durwans* and *constables*, also claim the designation.

(3) *Khandaits* form one of the distinct castes of Cuttack, and generally of Orissa, and are not to be found in other parts of Bengal. They seem to be descended from the Rajputs, and are a body of men analagous to yeomanry men. Their very designation signifying " a swordsman " show their military origin. They held lands under their Rajas as feudal chiefs. To this day they may be recognized as amongst the most able-bodied of the Uryas, and though having no pretensions now to military glory, they form one of the most skilled set of Urya agriculturists. Like the *Chasas*, who will be described below, and from whom they are hardly to be distinguished, they are the well-to-do cultivators of the village. Many of them have by sheer skill and industry risen to such circumstances as to be above the necessity of ploughing the land with their own hands, forming a contrast to some of the Brahmans, who, though failing to earn much, would not demean themselves by holding the plough. Although scattered all over the district, they are to be found in large numbers in the Jajpur subdivision. Some, however, are very poor, and seem to belong altogether to the lowest classes of Urya society, being most probably descended from those Khandait recruits who were obtained from the lowest castes living in the hills to serve in the militia under the officership of the higher class of Khandaits who were undoubtedly of Aryan origin.

(4) *Chasas*, as the name signifies, form the great cultivating caste of the district. From enquiries made among the villagers, it seems that there is no hard-and-fast line of distinction between the Khandaits and the Chasas. In his Statistical Account of Balasore, Dr. Hunter states that "Chasa" is the ordinary designation of the native Khandaits in Orissa as distinguished from those who live in, and who have come from, districts where the population is not exclusively Urya, such as the hill country or the district of Midnapore. If any distinction is to be made, it may be said that they are a step lower in rank than the Khandaits. Like them they are numerous in villages.

(5) *Karans* are the Kayasths, or people of the writer class of Orissa, known locally also as Mahantis. Some, whose ancestors served as the chief officers of the Native Rajas, enjoy the title of Patnaik or chief reader. They keep themselves aloof from the Bengali Kayasths who have settled down in the district as clerks and Government servants. Like the Kayasths, however, they follow intellectual pursuits, and are to be found in the ranks of patwaris, kanungos, tahsildars, pleaders, Government clerks and teachers, and like them too, they stand highest among the Uryas in point of education, intelligence and enterprise, monopolizing as a birthright all duties of revenue officers, accountants and lawyers. There are many also who are cultivators.

(6) *Baidyas* belong to the physician class, occupying a place between the Brahmans and Karans, and enjoying the privilege of wearing the sacred thread. They are a conservative class, and though possessed with a thorough knowledge of the efficacious medical properties of all kinds of wild shrubs and roots, they are very loath to impart that knowledge to any but those whom they regard as their heirs. Hence the doctors of a village belong only to particular houses. Some of them support themselves solely by the sale of their medicines, but others less fortunate take to agriculture, and also act as the veterinarians of the village.

(7) *Bhats* wear the sacred thread and claim to be Brahmans. They are described by Dr. Hunter as heralds and genealogists and carriers of letters of invitation on occasions of feasting or other ceremony. Mr. Sherring, a great authority on the caste systems of India, makes the following remarks about them:—" All families of respectability send for them on days of special importance and interest to themselves, when, in the presence of all assembled, they give in pompous language a genealogical history of the families that

have summoned them, or repeat the chronicles of the neighbourhood, or repeat passages from the Ramayana or other national poems.

(8) *The Baniyas* are the traders of the district, and are subdivided thus:—

(*a*) Gandha baniyas, *i.e.*, grocers and spice dealers.
(*b*) Bais baniya or general traders.
(*c*) Putli baniyas or spice dealers.

Besides these, there are others who hold an important place in trade (viz., Agarwallas and Marwaris), some of whom are rich merchants, whereas others are humble traders, who have all come into the district from the north-western portions of India. In addition there are the Kapariyas or cloth merchants, and the Kumtis or Madras traders.

(9) *The Telis* are professionally the oil-pressers and oil-dealers of the village. Though Sudras, their industry and skill have raised them to a position of respect among the lower castes. Many of them have established themselves as money-lenders and mahajans. In some villages the Teli is really the leading personage to whom the others resort to for money and advice. Some, however, are very poor and are engaged in agricultural pursuits. A subdivision of this caste, called Thurias, carry on a regular itinerant trade in oil-seeds. About half their number are engaged in agriculture.

(10) *The Guryas* are the makers and sellers of sweetmeat. They are not to be confounded with the higher class of Halwais or confectioners, as their chief profession is that of grain roasters. Rice, peas, gram, Indian corn and other kinds of grain are parched and sold by them either in their own huts or in bazars. As a class they are poor and are but little esteemed. Roughly speaking, about 25 per cent. of them follow agricultural pursuits, being chiefly engaged in the cultivation of turmeric.

(11) *The Bhandaris* represent the Napit or barber caste of Bengal. They occupy a very important place in the village community. The barber is not only employed for hair-cutting, shaving and paring the nails, but is a most busy person in all marriage ceremonies. He takes an active part in these ceremonies, and in Cuttack is the go-between in contracting marriages between two parties. He is thus regarded as the *confidant* of the family. He carries round invitations on palm-leaf to guests, accompanies the bridegroom to the bride's house, and assists the family *purohit* at the ceremony. He also shaves the newborn child for the first time about four months after its birth, and on the occasion of a death he shaves the heads of the male members. His wife holds a similar place among the female members of the family. None of this class take to agriculture.

(12) *The Kamars* are the blacksmiths of the village. As a rule their tools are very rude, but in spite of this they contrive to supply all the ironwork of the implements used by agriculturists and others. They also do all the repairs to all kinds of implements. In some parts of the district they are more commonly known as Lohars, and are to be found employed as agricultural labourers.

(13) *The Barhais* or carpenters attend to the woodwork of all kinds of agricultural and other implements. Like the blacksmiths, their ordinary work is very rude, but with a pattern before them they can turn out very good workmanship, and like the iron-workers, too, they are more intelligent and enterprising than the general run of cultivators.

(14) *The Kumbhars* or potters are the manufacturers of all kinds of earthen vessels and the makers of earthen idols, which are turned out in the most fantastic shapes. There is a proverb among them which will show how much their services are in demand—

"Kamara chakra mati bhori;
Sa Katyájonáy, Katyá Kori,"

i.e., we potters fill our wheels with mud, and our manufactures are put to all kinds of uses (good and bad, serving as the drunkard's cup and the widow's bowl). The designation Kumbhar is an abbreviation of the Sanskrit word *Kumbhakara*, which means the manufacturer of a *Kumbha* or water-jar. As a rule the *Kumbhars*, though generally poor, are very industrious, and are to be found engaged as agricultural labourers whenever off their own work.

(15) *Kansaris and Thataris* are the workers in brass and bell-metal. Many of them are very well to do, and are large mahajans. The population in some villages, *e.g.*, Bhatimoonda in the Sadar subdivision, is composed solely of these artizans, who manufacture utensils for domestic use, as well as to a certain extent make ornaments which are so largely worn by the women of the district. None of them take to agriculture as a profession.

(16) *Baruis* are chiefly engaged in the cultivation and sale of the pan-leaf. A few of them, however, have lands on which they grow sarad (winter) paddy. They are really immigrants from Bengal who have settled down here for generations.

They are also called *Burjis*, from *Baraj*, which is the field in which the *pan-leaf* is grown. They are scrupulous, painstaking and careful in the cultivation of the leaf.

(17) *Gaurs* form the great pastoral caste of Orissa, corresponding to the *gawallas* of Bengal Proper. They are to be found as domestic servants, and very largely follow the profession of palki-bearers. They all generally possess cattle, but are chiefly engaged in breeding cows, and in selling milk, curd and ghee, and about 25 per cent. or more of them are also engaged in agriculture, some serving only as *mulyas* or hired agricultural labourers.

(18) *Rarhis* differ from the Guryas, in that they prepare parched grain only.

(19) *Dhobas* are almost altogether engaged in the work of their own profession, or in chopping wood, though at times they are to be found working as agriculturists.

(20) *The Tantis* are the weavers, most of whom are now in very bad circumstances, as their industry is unable any longer to compete with English machinery. Although still adhering to their profession, many of them are obliged to look to agriculture as their means of living, and are to be found in large numbers as cultivating labourers. The work of weaving is chiefly done during their leisure hours by handlooms, by which a coarse but very strong specimen of cloth is produced. Some of them, viz., the Matibansi Tantis, however, have abandoned their hereditary occupation for teaching, and are found in all the indigenous *patshalas* of the rural tracts. The Ranginis, who form another subclass, are generally employed in dyeing (hence their name from Rang=colour). Other subclasses are represented by the Patnas and Hansis.

(21) *Tulabhinas*, as their name would signify, are a caste employed in carding or combing cotton. They are very poor, and are to be found in very small numbers.

(22) *Keots* belong to the fisherman class, and are subdivided into Raris and Siolis. The former do not catch fish, but engage chiefly as boatmen. With the Keots they render great service to cultivators by having boats always ready to ferry the villagers over on the way to the market or to their fields.

(23) *Kaibarthas* are engaged both as fishermen and boatmen, chiefly in the latter capacity. Like the Keots, they use the net alone.

(24) *Gokkhas* form the lowest of the fishing castes, who entrap fish for the most part in baskets. In return for rent-free grants of land, they also supply firewood when required for festivals, and collect and carry canes and posts from the jungle for the repair of houses.

(25) *Bauris* belong to a semi-aboriginal caste, and are generally engaged as ordinary day-labourers. Many are employed also in husbandry, especially in ploughing, picking up the roots of wild weeds, and cutting paddy during the harvesting season.

(26) *Kandaras* are ordinarily engaged as village watchmen and are paid by jagir land. Some, however, are also employed as agricultural labourers, and others have lands of their own and are not to be unfavourably compared with the Khandaits as cultivators, having in many cases all their skill, industry and strength.

(27) *Pans*, like the Kandaras, belong to a very low caste, having traces of aboriginal descent. Like them, they are much darker than the higher caste Hindus, and as a rule are employed as ordinary day-labourers.

(28) *The Domes*, like the Haris and Chamars, are loathed by higher class Uryas. They beat drums on festival days, in which work the Pans also take a part. They make baskets and other articles of bamboo and palm-leaf, and during the cremation of the dead supply wood and straw.

(29) *Haris* belong to the sweeper class, who, besides doing the work of their own profession, also beat drums in the mufassal on festival days.

(30) *Chamars* are the traders in leather, and are accordingly regarded as unclean in the estimation of the higher castes. Cattle and other animals dying of disease are removed by them, it being their privilege to possess themselves of the hide of the dead animal. Closely associated with them are the Moochies, who are generally engaged as shoemakers. Some Chamars have service grants of small patches of land rent-free, for which they have to supply palm-leaves for the preparation of office records, and also make palm-leaf mats for the walls of the cutcherry. They generally take the lease of all palmyra and date-palms, and engage as tappers of the latter, selling the juice in a fermented condition as toddy.

(31) *The Bhumij and Bhunyas*, who are to be found at the foot of the hills on the western frontier, are two tribes of the Kole race, whose original country is said to be Kolant Desh, lying between Mohurbanj, Singhbhum, Jynt, Bonye, Keunjhar, and Danbhum. Some cultivate their own lands in the mountainous tracts of the western frontier of Cuttack, while others take work as day-labourers.

(32) *Kandhs* are to be found in small numbers in the Cuttack district, as they reside chiefly in the mountains of the Tributary States. They are very simple in their habits, are fond of hunting, and well understand their rights in the soil of their native hills, where their chief business is agriculture.

(33) *The Sahars* form the most important aboriginal tribe of the Cuttack district. They are much more civilized than the other tribes, and are generally very industrious.

SECTION 2.—*The character of different castes as agriculturists.*

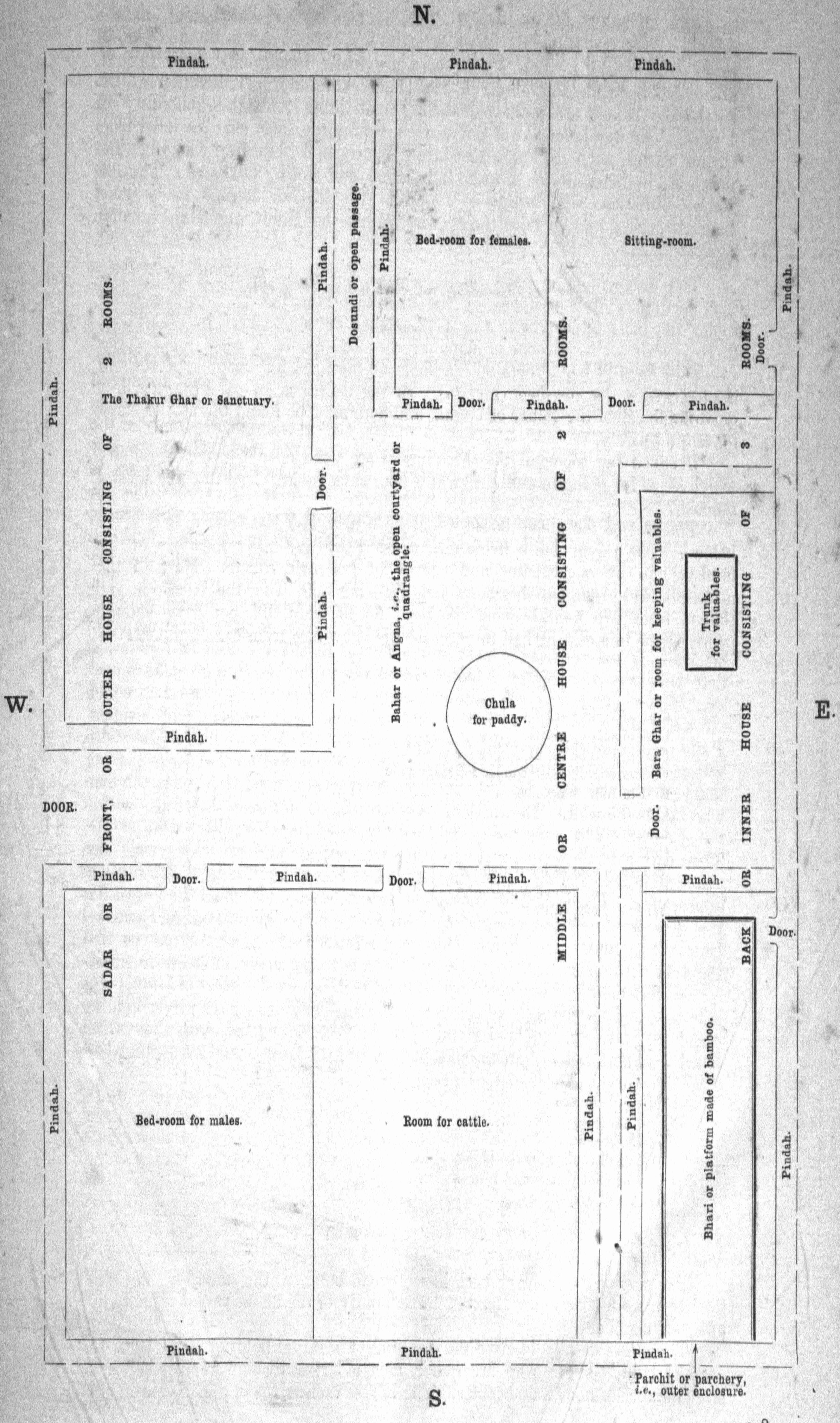
To those who are acquainted with the modes of agriculture in vogue in Lower Bengal, and who have at the same time gone over the villages and fields in Orissa, it will be at once evident that the Urya peasant is rather behind his Bengali brothers. He lacks the foresight of the Bengali; he is a more indolent workman and a stronger conservative, and is thoroughly content in blindly following the practices of his forefathers. Trained to look upon Divine nature as the great manurer of his soil, he is comparatively ignorant of the use of manures. In his own village his lack of energy and his religious prejudices make him often lag behind his Muhammadan neighbour, who with less skill but with greater enterprise is able to secure greater comfort for himself. Speaking now of the different castes of agriculturists in Cuttack, a little touring into the interior of the district will reveal at once that the Khandaits and Chasas are generally the best agriculturists. They form the majority of the agricultural population, and compare most favourably with the other castes engaged in agriculture, being as a rule more intelligent and more hard-working. The Kandaras, like the Khandaits, are able-bodied men and make good labourers, but unfortunately with the Pans, Haris and other low castes, they are given to toddy-drinking. The Brahmanical class are not, as a rule, considered to be good agriculturists. There is a proverb current among the Uryas, which states that "Cultivation cannot be successful with the Brahmans, as their work being chiefly done by hired labour, the ploughing is never deep enough, the result of which is that immediately after ploughing, the grass and weeds fall back to their own place and coming up after, choke the growth of the crop." But this is not strictly accurate, as there are a number of Brahmans who till up lands with their own hand. To them the sobriquet of *Sarua* Brahman is applied, from the fact that they grow the *saru*, a vegetable very extensively consumed by the Uryas. Some of them perform only the minor operations of cultivation, while others drive the plough and are, as already stated, styled Halia Brahmans. While in Banki, I found that the Brahmans who had come over from Atgurh, and called Atguriah Brahmans, were the most intelligent cultivators in that estate. Although refusing to drive the plough, they knew much more about agriculture than men of lower castes, and monopolized the cultivation of all the more profitable crops, including vegetables. The proverb alluded to above also condemns the Mahanti as a cultivator. "His orders," according to the proverb, "are given seated on a stool at home, instead of in the field, and the work, therefore, is not done properly." This is true to a great extent, as the intelligence of the Mahanti, which is of no low order, runs in the direction of intellectual pursuits. The *Baruis*, who are really immigrants from Bengal, are, as has been already observed, especially skilful in the cultivation of the betel-leaf. They are more painstaking cultivators than the generality of Uryas. The day-labourers of the district are for the most part recruited from the low castes, such as Pans, Kandaras, Bauris, and Bhumijes, who when not indulging in drink are found to be industrious and willing workmen. The few Native Christians who are to be found in the district seemed to be good honest workers, and to hold their own against the Hindu and Muhammadan agriculturists.

SECTION 3.—*Material condition of the people.*

(*a*) *Dwellings.*

The condition of a raiyat's house varies with his own material condition. In hill tracts like Sukinda, which is inhabited principally by semi-aboriginal tribes, and the very lowest castes, such as Pans and Kandaras, all of whom obtain a rather precarious living as labourers, the huts are made simply of the leaves and twigs of the jungle, often thatched over by a roof made of a coarse kind of grass known locally as *banaghas.* These houses when belonging to cultivators are fenced round also with twigs, to serve as a protection for themselves and their cattle against the ravages of wild beasts. Sometimes, each hut has a piece of homestead land fenced in, where threshing, husking, and other similar operations are carried on. The houses themselves are generally not arranged on any regular plan, each having its own aspect. The hut of an ordinary raiyat is one of which the walls are made of mud, thatched over with a roof of straw or grass. The earth needed for the construction of his walls is dug out from a spot situated close to the site selected by him, so that there may be a saving in labour, and then piled up in a great heap near by. The boundaries are next marked, and the portion of the ground on which the walls are to be erected is dug with a *kodali,* well watered and levelled. *Pattu* or alluvial soil is considered most suitable. It is made into a paste with water, and then handfuls of it shaped into the size and form of large putting shots are thrown over by two or three relays from hand to hand to the man who builds the wall. The earthen balls are placed one over the other within the space allotted for the walls, and then cemented together with a thin puddle. Then with a small flexible rod the sides are scraped, and the whole wall once again plastered over with a mixture of mud and cowdung to give it a finished appearance. The wall itself consists of several layers, of which the lowest has the greatest depth and thickness. The floor of the house is slightly raised from the ground. The roofing consists of a framework of split bamboos tied together with string, and thatched over by a covering either of straw or grass.

Such would be the dwelling of a man holding about 3 acres of land. One who is better off would have a more elaborate dwelling, *e.g.*, a raiyat holding about 10 to 15 acres of land would have two *bakhulis* or yards with about three houses. The following ground plan will show how these would be arranged:—


N.
Pindah.
Pindah.
Pindah.
OUTER HOUSE CONSISTING OF 2 ROOMS.
The Thakur Ghar or Sanctuary.
Pindah.
Pindah.
Dosundi or open passage.
Pindah.
Bed-room for females.
Sitting-room.
Pindah.
Pindah.
Door.
Pindah.
Door.
Pindah.
ROOMS.
ROOMS.
Door.
Door.
Pindah.
Bahar or Angna, i.e., the open courtyard or quadrangle.
Chula for paddy.
CENTRE HOUSE CONSISTING OF 2
Bara Ghar or room for keeping valuables.
Trunk for valuables.
INNER HOUSE CONSISTING OF 3
W.
E.
Pindah.
DOOR.
FRONT, OR
SADAR OR
Door.
Pindah.
Pindah.
Door.
Pindah.
Door.
Pindah.
OR
MIDDLE
OR
BACK
Door.
Pindah.
Bed-room for males.
Room for cattle.
Pindah.
Pindah.
Bhari or platform made of bamboo.
Pindah.
Pindah.
Pindah.
Pindah.
Parchit or parchery, i.e., outer enclosure.
S.

The plan was taken by me on the spot. The entrance to the house is on the west. The walls (kanta) are all made of mud, and are 9 feet in height from the ground to the eaves (oli). The roof or chauni is constructed of bamboos and wood fastened together with *noi* (a creeper), split cane and thin coir rope. The hip rafters, ridge pole and posts are made of wood, and the doors and windows of sawn timber. The thatching, which in this particular case is 9 inches thick, consists of paddy straw. There is a verandah or pindah raised about 2 feet from the ground, which runs right round the parchit or outer enclosure. The dwelling itself is divided into the outer or sadar ghar, the central division or khaluri, and the back or inner ghar. Each of these consists of two or more rooms or bakhras, round which verandahs run as round the outer enclosure.

The sadar room is open to all comers, but those behind it are private, as a portion of it is occupied by the females of the family. Among other rooms the most important is the Thakur ghar or sanctuary. Besides these, there is also a sitting-room or danghar, two bed-rooms, a room for keeping valuables (bara ghar), a room with a bhari or platform for keeping stores and implements, and a cowshed (gohara). In the centre is an open courtyard, a quadrangle called the Bahar or angna, and here may be found the atoi or stack for storing paddy.

Between the rooms of the three houses are some open passages (dosundi), which serve for going in and out, while doorways (doara) lead into the several rooms.

The cost of the above house would be nearly Rs. 100 (*vide* details given below). The raiyat built it himself, assisted by the other members of his family, and by a carpenter and coolies of his own village. Most of the materials were purchased from a neighbouring *hât*, and the bamboos and timber from two neighbouring villages. As the man did not have enough paddy straw in stock, he had to purchase his straw also from his neighbours:—

Cost of Sadar house.

	Rs.	A.
Cost of laying out foundation	2	0
Cost of raising walls	7	0
Cost of two pieces of timber for poles	2	8
Cost of one piece of timber for ridge pole	1	4
Cost of four side poles	2	0
Cost of bamboos	7	0
Cost of string	1	0
Cost of straw	5	0
Wages of coolies for thatching	0	12
Cost of door panels and frames	3	8
Wages of carpenter	3	0
Total ...	35	0

Cost of the centre house.

	Rs.	A.
Cost of laying out foundation	1	8
Cost of raising walls	6	0
Cost of two pieces of timber for poles	2	0
Cost of one piece of timber for ridge pole	1	0
Cost of bamboos	6	12
Cost of string	0	8
Cost of straw	4	0
Wages of coolies for thatching	0	8
Cost of door panels and frames	1	12
Wages of carpenter	2	0
Total ...	26	0

The cost of the inner or back house would be about the same, so that the total cost would be about Rs. 90. The family of the above raiyat is made up of seven members.

The above details describe the dwelling of a raiyat holding about 10 to 15 acres of land. Those who are richer have a larger dwelling consisting of a large number of houses and rooms. The houses themselves in this case are built of better materials and more timber, and vary in cost up to Rs. 300 or Rs. 400. As has been already mentioned, the houses in the villages are not constructed on any very regular plan. Among the poorer classes, isolated huts are found scattered all over the village without any regular order, but those that are better off build very often in rectangular blocks, so that the village wears a neat and compact appearance. The roads through the villages are in such cases kept pretty clean, hedged in on both sides by *kaya ghas*, or cactus, or some other fencing, and the refuse is heaped up in particular spots instead of being thrown all over as is the case in poorer villages. The houses themselves are also kept neat and tidy, being thatched and repaired annually. The floor is polished almost every week with cowdung and mud, and the walls are kept decorated with all kinds of fantastic figures drawn on them in gorgeous colours with *chunam*, rice powder, turmeric and red earth.

In some villages, as in Banki and Khanditar, the houses are built in two rows with a broad walk between. Each door very often represents a separate house, and the rooms all extend one behind the other. This plan has been gradually adopted from the Tributary Hill States, where the houses, I am told, are generally built on this plan instead of in square blocks. The houses out in the interior are kept in much better order than those in town, where the *bustees* are generally filthy and stuffy. It may also be noted that the Hindu cultivator far surpasses his Muhammadan brother in his ideas of neatness and cleanliness, the change being quite perceptible and most welcome in passing on from a Hindu village to a neighbouring one inhabited by Muhammadans.

(*b*) *Food.*

Cereals and their preparations.—The staple crop of Cuttack, in common with the other districts of Orissa, is rice. It forms the main portion of the meal of a raiyat, being supplemented often by the coarsest sort of pulse. Speaking generally, the sarad or winter rice is consumed from the month of Magh to the month of Bhaddra, while the autumn or winter rice is eaten in the months of Awsin, Kartik, Agran and Pous. If the biali crop, however, is not a good one, it does not last for consumption beyond the first half of Agran, when the sarad rice has to replace itself; but when, on the other hand, the biali harvest has been plentiful, it is enough for consumption even up to Magh, while a stock is often laid by in such cases for the following year's consumption in the month of Bhaddra. Dalua rice supplements the other two varieties during the spring months of the year. As a meal, rice is always taken in a boiled form as *bhat*, but there are many preparations of it, which are in common use among the cultivators. *Muri* or rice steeped with the husk on, then slightly boiled, husked and parched with salt; *chira* or rice boiled in the husk and husked when warm; *huruma*, a preparation similar to *muri; khai* or rice parched with the husk on; *ukhurá*, *i.e.*, *kkai* sweetened with gúr ; *pakhal bhat* or rice cooked and set aside till sour, are made often among the poorer classes to take the place of rice, though as a rule they are really taken as luxuries in addition to rice. The last-named preparation, however, is very commonly used by the labourers, forming generally their morning or midday meal, being an especially common dish among the boatmen of the district. The more well-to-do also indulge in such solid preparations as *pithá* or cakes from rice-flour; *satu* or parched rice well ground; *khiri* or rice boiled with milk and sugar, and *khenchuri* or rice boiled with *dal* and spices. Besides rice, there are a few other cereals which form occasionally the farinaceous food-grain of the people. They are *mandia*, *china*, *kangu* and *suan* (*vide* Chapter III for botanical names). These, however, are chiefly confined to the lower classes, who take them in the form of bread or gruel, or simply boil them like rice to be eaten with *sag* and vegetables. Wheat, barley, and maize are grown in such small quantities that they can scarcely be said to enter into the meal of the raiyats.

Pulses.—The pulses which ordinarily form the food of the people are *muga*, *birhi*, *kulthi*, *chana*, and *harar* (*vide* Chapter III for botanical names). As found in the villages, they are very coarse, but even then, with many they form luxuries, as they cannot afford to eat them with their rice every day, and so have to supply their place with a little *sag* or some kind of vegetable obtained from the jungles.

Greens or *sags.*—The *sags* commonly cultivated by the people are *kusura*, *champanatia*, *palang*, *pui*, *sijna*, *khara*, and *purikha*. A large number of varieties of greens are also found in the jungles, among which may be mentioned the following shrubs:—*Barda*, available in February and March; *majukchulia*, available from April to June; *madranga*, *kainjari*, and *puruni*, available in April and May; *chauldhua*, available in May and June; *nahanga*, available from May to December; *goicho*, available in October; *bathua*, available in November, December, and January. Besides these there are many creepers which furnish good *sag*, such as *gurukhia*, *gakhura*, *phandi*, *panjia*, *bhadabhadria*, *nuden*, *pitagama*, *machimachia*, and *bana*. Among aquatic weeds, the following find great favour:—*Kulni*, *kalama*, *sunsunia*, and *hirimchi*. The leaves of many trees, *e.g.*, the *nima* and *kantamaris*, are also edible as *sag*, being, like all other greens, either boiled or fried with salt and eaten with rice.

Vegetables.—The local and scientific name of the vegetables cultivated in the district will be found in Chapter III. Among them brinjals and *saru* hold the chief place, being largely partaken of by the raiyats. Sweet potatoes (*kandamul*) and yams (*khamb-alu*) are also very common, and so also are pumpkins (*baitakakharu*) and bottle-gourds (*lau*). Indian beans and radishes are eaten to some extent, but vegetables like potatoes and *patal* are out of the reach of the cultivator, the former not being eaten out of Cuttack town, except by the richest people.

Edible jungle roots and fruits.—A list of these will be given in Chapter IX, and need not be reiterated here. Suffice it to say that they form a large portion of the food of the poorer and lower caste people. In the hot season, during the months of Falgun, Chaitra, Baisakh, and Jaishti, the semi-aboriginal classes regularly collect roots and fruits from the jungles which they eat with or without rice. Roots are generally eaten boiled, while fruits are taken uncooked. During the rainy months, the jungles being full of snakes are avoided as much as possible by many, and during the cold weather months some people as a rule are too busy with the winter harvest to go out much in search of jungle eatables, but still in spite of this, throughout the year there are some who may be found going out in search of food into the jungles.

Fish and flesh food.—Fish is not an uncommon item in the meal of the Urya. All along the sea-coast, large quantities of fish are sun-dried and sold in the various markets of the district, and are used by the poorer people as a relish with rice. Women and children may also be found entrapping small fish in various ways to supply themselves with a curry for their rice. The more well-to-do who can afford it will always buy fish from the market for their meals. Animal flesh, however, is much scarcer as an article of food. The higher caste Uryas indulge in goat flesh or mutton occasionally, as well as in the flesh of the deer and sambar, but as a rule very few are found among the agriculturists who can afford or care to include meat in their meals. The Muhammadans enjoy beef and fowls in addition, but these are rare items in their every-day food. The lowest castes, such as the Pans, Haris, Sahars and other aboriginal tribes, eat the flesh of all kinds of dead animals. They are also to be found hunting hares, deer and wild boar. The first of these are driven into a trap, and when secured, the prey is equally divided among the bush-beaters, the skin being thrown away, and the meat doled out in equal shares. Deer and wild boar are similarly divided when knocked down with the bow and arrow. The Kandhs of the Gurjats, some of whom are to be found in the district, do not object even to eat the flesh of tigers, monkeys and snakes. Crows are found palatable to gypsies.

Oil and ghee.—The principal edible oil of the district is mustard oil, but what is sold as such in most villages among the poorer classes is a mixture of mustard with other kinds of oil, such as linseed. Oil is used for cooking vegetable and fish curries. Among the richer classes ghee also takes a part in cooking.

Condiments, &c.—Turmeric and chillies are among the most common condiments. Onions and garlic are especially appreciated by the Muhammadans. Coriander, aniseed and ginger are to be found in the kitchens of the richer classes. Salt and tamarind are largely patronized by the poorer people, who make them serve as sauce for their meals, when they cannot afford to buy fish or vegetables. Cultivated fruits, milk and sugar can only be indulged in by the well-to-do people.

Meals.—Most cultivators have two meals a day, one at noon and the other at night. There are some, especially among boatmen, who have a third meal at seven in the morning. As a rule, however, the peasant goes out in the morning before the sun is up to do his field work without partaking of any food, though there are some who enjoy a mouthful of parched rice before beginning work. At noon, he returns home to have his midday meal consisting of boiled rice, some curry of fish or vegetables or *sag*, and some *dal*. After an hour or so, he again begins work, leaving off after dusk, when he returns home, gives some chaff to his cattle when he can afford it, and after a little rest, enjoys his evening meal, which consists of the same kind of food as that partaken of in the day. Nearly everything that is required for his meals is grown by himself. The market value of the food taken in his daily meals is given below. The figures represent the expenses of an ordinary raiyat with a family of five members, viz., a man and his wife, his mother and two children, and are a very fair average of the ordinary cost incurred per diem throughout the district by raiyats similarly circumstanced:—

Cost of daily food.

	Rs.	A.	P.
Rice	0	2	0
Dal or fish	0	0	1½
Vegetables	0	0	1
Salt	0	0	1
Oil	0	0	1
Spices (turmeric, &c.)	0	0	1½
Tobacco	0	0	1
Betel and betelnut, &c.	0	0	1
Total ...	0	4	0

Taking the two children as one adult, the cost of food per adult amounts to one anna per day, or Re. 1-14 per mensem. The monthly expenses of the above family would be Rs. 7-8 and the yearly Rs. 90. From figures taken by me in several villages, I found that the more well-to-do raiyat lives on six to seven pice per day.

From minute enquiries made by me throughout the district, and figures taken in several villages showing the quantity of rice consumed by different families throughout the year, and the amount cooked per day, I find that from half to three-fourths of a seer of paddy represents the daily average consumption of an adult member. Taking one seer as the normal requirement of food for an adult member, these calculations would go to show that the majority of raiyats suffer from an insufficiency of food, rice representing the staple food of the district. The scale of diet runs short by one-fourth of the full scale of rations.

(*c*) *Clothing.*

Men.—The dress of an average Urya raiyat consists of a *dhuti*, a piece of cotton cloth which is wrapped round the waist and falls over the thighs, a *chaddar* or cotton sheet which is worn round the body, and a *gamcha*, a small sheet which takes the place of the *chaddar*, when the raiyat is at work. The first of these is generally of English manufacture. A garment measuring 7 cubits in length and 1¾ cubits in breadth costs the raiyat about 8 annas. The second is valued ordinarily at a rupee, and is of stout make, serving the raiyat as a winter wrapper. It ordinarily measures 7 cubits by 3 cubits. The third, which is put to rough use, and is generally of strong country manufacture, is sold at about 4 annas a piece, measuring 5 cubits in length and 1½ cubits in breadth.

Besides the above, each raiyat generally keeps an extra *dhuti* and *chaddar* for special occasions, costing 12 annas each.

Boys.—The male children of the raiyats wear similar pieces of cloth, the only difference being that they are proportionately of smaller sizes. The measurements of a boy's *dhuti* are 6 cubits long and 1½ cubits broad, of his *chaddar* 5½ cubits long and 1½ cubits broad, and of his *gamcha* 4 cubits long and 1¼ cubits broad. The prices of the above are 6, 8, and 3 annas respectively.

Women.—The clothing of an ordinary peasant woman consists of a *sari*, which is a long piece of cloth measuring about 13 cubits in length and 2¼ cubits in breadth. It is worn from the head down to the knees, being tied round the waist, and allowed to drop from the head in the form of a drapery. The Urya women, as a rule, wear their *saris* higher up the legs than the women of Bengal. Those of the poorer women often barely reach the knees. The mode of wearing this dress differs in the Muhammadan women, who can readily be distinguished by her *sari*, which reaches down to the ankles, and drops from the waist in a different fashion from the dress of the Urya woman. Muhammadan women and Christian women are also to be sometimes seen in jackets, which are never worn by the Uryas. The cost of a *sari* of the above measurements is about Re. 1·8.

Girls.—The *sari* worn by girls is of the same material and of the same fashion as that worn by women, the only difference being that it is smaller in size. One measuring 12 cubits by 2 cubits would cost Re. 1. Both girls and boys under five years of age wear no clothes whatever, going about in a perfect state of nudity. When a little older they are given generally one small piece of cloth, and as they advance in age, they get all the different pieces which form the peasant's dress.

Cost of clothing per annum.—According to the figures given above, which represent the prices of different kinds of clothing for an ordinary peasant as closely as possible, the total cost for clothing throughout the year for the family of five members already referred to would be as follows:—

	Rs.	A.	P.	Rs.	A.	P.
For the man (for ordinary wear).						
2 Dhutis at 8 annas each	1	0	0			
1 Chaddar at 1 rupee	1	0	0			
1 Gamcha at 4 annas	0	4	0			
	2	4	0			
				2	4	0
For the man (for festive occasions).						
1 Dhuti at 12 annas	0	12	0			
1 Chaddar at 12 annas	0	12	0			
	1	8	0			
				1	8	0
For his wife.						
2 Saris at Re. 1-8 each	3	0	0			
	3	0	0			
				3	0	0
For his mother.						
2 Saris at Re. 1-8 each	3	0	0			
	3	0	0			
				3	0	0
For his two children.						
4 Small dhutis at 6 annas each	1	8	0			
	1	8	0			
				1	8	0
Total ...				11	4	0

It will be seen from the above that very little satisfies the average peasant in respect of clothing. Even if he could afford it, anything over and above what has been given above would be considered by him too much of a luxury, and would accordingly be avoided. A shopkeeper with the same means would be found to have one or two more pieces of cloth and something of a warm texture for winter. The peasant, on the other hand, would first think of providing himself with a better meal. Although such average peasants cannot, therefore, be said to be suffering from a poverty in clothing, it must be remembered that there are many of the labouring classes and of low-caste people who can ill-afford to buy themselves even one suit throughout the year. Such men generally wear coarse cloth of country manufacture, for though involving a slightly higher initial expenditure than English-made goods, they are made to do service for a much longer period of time. It would not take long to find out men in small villages in the interior, and in the neighbourhood of jungles inhabited mostly by the hill tribes, who make one sheet do service both for the *dhuti* and *chaddar*, and a ragged piece of cloth as a substitute for the former when it needs washing. The upper classes, on the other hand, indulge in all kinds of fine dresses. Taking an inventory of the clothes of a well-to-do raiyat holding about 100 máns of land, I found that the value of those in his possession at the time for the use of himself and his wife amounted to Rs. 60 nearly. The particulars are given below:—

For the man (for ordinary wear and special occasions).

	Rs.	A.	P.
3 Dhutis of English manufacture	2	8	0
3 Ditto country do.	3	12	0
2 Chaddars of English do.	0	12	0
2 Ditto country do.	2	8	0
2 Gamchas	0	12	0
1 Chaddar of broadcloth	8	0	0
1 Ditto Cashmere cloth	2	0	0
1 Coarse warm country chaddar	3	0	0
1 Dhuti and chaddar of tusser	5	12	0
Total ...	29	0	0

For his wife (for ordinary wear).

	Rs	A.	P.
2 Large saris of cotton	4	0	0
1 Small sari	1	8	0
1 Warm chaddar	3	0	0
1 Chaddar of cotton	1	8	0
Other clothes for special occasions of tusser and of fine cotton	20	0	0
Total ...	30	0	0
i.e., For the raiyat himself	29	0	0
For his wife	30	0	0
GRAND TOTAL ...	60	0	0

Shoes and slippers are not worn by the cultivating classes, but well-to-do shopkeepers generally have a pair of coarse country slippers. They are made of soft leather, and are elaborately embroidered over with coloured thread. Their shape differs from those used in Bengal, the Urya slippers having long turned-up toes and broad heels. The price of a pair varies from annas 12 to Re. 1. Sandals are also put on by the respectable classes even in villages. They are made of *sál*, *piasal* or *sissu* wood, and cost from 3 to 6 annas.

(*d*) *Ornaments.*

The women of the district deck themselves in a very large variety of ornaments, made of glass, lac, bell-metal, brass, silver and gold. The male adults seldom put on any ornaments, beyond small earrings and a chain for the neck. The boys of the family also generally wear ornaments when the raiyat can afford them. The ornaments of the women comprise bracelets, armlets, anklets, earrings, finger and toe rings, and hair pins of different kinds. The ornaments worn by the members of the family whose clothes and dress have been already described are given below:—

For the raiyat's wife.

			Rs.	A.	P.	Rs.	A.	P.
2	Kharuas	for the wrists, of brass ...	1	8	0			
2	Shankas	„ „ of lac ...	0	4	0			
2	Kathuris	„ arms, of brass ...	0	12	0			
1	Mali	„ neck, of glass ...	0	1	0			
2	Nalis	„ ears, of brass ...	0	1	0			
2	Baras	„ ankles, of bell-metal ...	1	8	0			
2	Mudis	„ toes, of bell-metal ...	0	1	0			
1	Chaurimundi	„ hair, of silver ...	0	10	0			
		Total ...	4	13	0			
						4	13	0
		For the eldest son.						
2	Nalis	for the ears, of gold	4	8	0			
2	Kharuas	„ wrists, of silver	4	0	0			
1	Kanthi	„ neck, of wood, without any silver or gold	0	0	1			
		Total ...	8	8	1			
						8	8	1
						13	5	1

The raiyat himself and his second child wear no ornaments, nor does the widowed mother. The total cost for jewels to the above family thus amounts to Rs. 13-5-1. It will be seen that although the number of ornaments worn by peasant women is very large, their intrinsic value scarcely exceeds Rs. 5, the ornaments being mostly made of cheap materials, such as glass, lac, bell-metal and brass. Gold and silver jewels, however, are worn along with cheaper ornaments by the women of the more well-to-do raiyats. The wife of a raiyat holding 100 máns of land would have the following:—

			Rs.	A.	P.
2	Kharuas	for the wrists, of bell-metal ...	3	0	0
2	Shankas	„ „ of lac	0	8	0
2	Kathuris	„ arms, of brass ...	0	12	0
1	Mali	„ neck, of glass ...	0	1	0
2	Nalis	„ ears, of gold ...	20	0	0
2	Baras	„ ankles, of silver ...	20	0	0
2	Mudis	„ finger, of silver ...	3	0	0
1	Chaurimundi	„ hair, of silver ...	2	0	0
1	Gujikhata	„ „ of silver ...	2	0	0
1	Dandigura	„ nose, of gold ...	2	8	0
1	Basuni	„ „ of gold ...	7	0	0
1	Champakarhi	„ neck, of silver ..	10	0	0
1	Chapsirimal	„ „ of silver ...	4	0	0
1	Mahumala	„ „ of silver ...	3	0	0
1	Kanthi	„ „ of silver ...	4	0	0
		Total ...	81	13	0

Unlike other parts of Bengal, it is the practice in Cuttack for the old women of the family, provided they have their husbands living, to put on just as many ornaments as the younger female members. Widows, however, wear on ornaments whatever. On the death of a widow, her ornaments are divided in equal shares among the unmarried daughters and the daughter-in-law of the family, the married daughters getting nothing under such circumstances. They may, however, receive presents from the mother during her lifetime. When the sole close relations of a family are married daughters, the ornaments of the widowed mother on her death pass into the hands of distant connexions.

(*e*) *Plates, domestic utensils, furniture and agricultural stock.*

Plates and domestic utensils.—Among the poorest classes the only domestic utensils in use are those made of earthenware, which cost little or nothing. The averagely circumstanced raiyat can, however, always show some vessels of bell-metal and brass. The details are given in the list below, which represents the utensils which would be found in the possession of such a family as that referred to in the preceding paragraphs :—

Names of utensils and their prices.

	Rs.	A.	P.
3 Balis or bowls of bell-metal (generally used for keeping rice over-night)	3	0	0
3 Thalis or plates of bell-metal for cooked rice	3	0	0
3 Katoras or cups of bell-metal for curries	1	8	0
2 Lotas or small water-pots of brass	1	8	0
1 Ghurra or large water-pot of brass	2	0	0
5 Handies of earthenware for cooking and for water ...	0	1	0
1 Phitakurka or spoon of iron for turning over bread ...	0	1	0
1 Karcheli or spoon of iron for taking out food from handies	0	1	0
1 Chattu or spoon of wood for stirring rice	0	0	0½
1 Danka or hollow spoon of cocoanut shell with a wooden handle	0	0	0½
Total ...	11	3	1

There are a large number of labouring men who could not afford so many vessels, and whose plates and domestic utensils would cost only Rs. 3 or Rs. 4. The very well-to-do raiyats, on the other hand, though not using a greater variety of articles than those given in the above list, would have a larger number of vessels, as well as larger vessels, the valuation of which would amount on an average to Rs. 50. The wealthy raiyat previously referred to had, as a matter of fact, vessels whose total cost I estimated at Rs. 66-8-2.

Furniture.—Although the standard of luxuries may be said to have risen and to be rising among the ordinary agricultural classes of the district, it is anomalous to find that the standard of comfort has been pretty stationary. This may *primâ facie* appear a contradiction, but what I mean is that the agricultural classes display an eagerness to give their women as many ornaments as possible, and to buy as many utensils as they can afford for their kitchen, but they give little or no thought to clothing themselves more warmly in winter, or putting into their houses more comfortable articles of furniture. The taste of the farmer in respect of clothing and furniture is very simple. The articles to be found in a cultivator's house for his personal use are thus very few, consisting of a few mats for sleeping on, and perhaps a small basket for keeping clothes and a small plank of wood to serve as a seat. The entire cost of all these would not much exceed one rupee. Most of the furniture which may be found in the house of an ordinary raiyat pertains to his work, consisting of mats for drying paddy, and baskets and earthen jars for holding grain. In the houses of the more well-to-do raiyats, however, mats give place to *taktaposhes* or cots of wood, and cane baskets to boxes of wood and tin.

Stock (*dead and live*).—The names of all the agricultural implements used in the district will be given in Chapter III. It will suffice here to give the valuation of the stock ordinarily belonging to a cultivator of average means. Such a man would have the following implements and live-stock :—

	Rs.	A.	P.
4 Ploughs (*nangal*)	3	8	0
1 Harrow (*mahi*)	0	8	0
1 Rake (*bida*)	4	0	0
2 Spades (*kodalis*)	1	8	0
1 Mattock (*kankh*)	0	10	0
5 Sickles (*dao*)	0	8	0
1 Crowbar (*kanthi*)	0	3	0
1 Hatchet (*katuri*)	0	5	0
2 Baskets for irrigation	0	4	0
4 Baskets for sifting grain	0	2	0
6 Baskets for carrying paddy, dung, &c. ...	0	8	0
4 Brooms	0	0	2
String	0	2	0
1 Pedal (*dhenki*) for husking grain ...	1	0	0
2 Bullocks	20	0	0
Total ...	33	2	2

(*f*) *Indebtedness, Agricultural Capital.*

Material condition of raiyats, their indebtedness.—The circumstances of the people have no doubt considerably improved during the last twenty or thirty years. Official reports state that the peasantry have quite recovered from the effects of the famine of 1866, and that there has been a marked advancement in the prosperity of the agricultural community due to a succession of good harvests. The development of the export trade in rice, brought about by the opening of good roads and new water communications, which have afforded great facilities for the transport of produce, have improved the position of the cultivator, inasmuch as he is able to take advantage of a good harvest to sell his produce for a remunerative price. Evidence of this improvement is also to be seen in the substitution of metal plates for earthenware utensils, in the increase in the stock of metal ornaments worn by women and children, in the increase of wages in skilled and unskilled labour, and in the large increase in the importation of piece-goods and other articles of comfort and luxury. Yet, in spite of all this improvement, it cannot be said that the condition of the agricultural classes is very satisfactory. Their prosperity is very precarious and liable to disappear as soon as a bad year comes round. The people themselves are very improvident, and rice being the sole source of living to the mass of the population, it seems to me that a single really bad year for the rice crop will be enough to throw the people back. As has been well remarked in an old report, the progress of the district in the present state of affairs is never likely to be more than "intermittent and must always be liable to relapses." "If progress in Orissa is to be finally secured and maintained, it must be by the introduction of other agricultural products and of manufactures." Such is the opinion of the same authority, an opinion and a remark which seems to be very applicable to Cuttack. Any one who has any personal knowledge of the district will know that the raiyats best off are those who combine agriculture with other speculations. Many of the conservative Uryas are in this respect greatly handicapped by their more prudent brethren, and by Muhammadans who speculate in hides and other articles of trade. It is a query whether the ordinary Urya raiyat cares to raise himself above a hand-to-mouth existence. He is quite satisfied if he can produce enough to keep himself and his family going for the time. The extra trouble, labour and anxiety necessary to enable him to lay by for a rainy day is altogether unacceptable. In addition, therefore, to the danger that the district suffers under, perhaps to a greater extent than many other districts of Bengal, of being dependent solely on the rice crop, which itself cannot be much counted upon in a country like Orissa, so peculiarly liable to floods, droughts, storms, and seawaves, there comes in the proverbial laziness, conservatism and improvidence of the Urya peasant to render his prosperity all the more doubtful. Dealing now with the actual condition of the people, I may assert with some degree of confidence from enquiries made by me in every part of the district among ordinary raiyats, village headmen, mahajans, managers of estates, Government officials, and many others who are likely to be correctly informed on the subject, that very nearly 75 per cent. of the agricultural population is in debt. In my own experience, I came across very few who were not in debt, so that I don't think that the figure given above is at all exaggerated. The results of such an enquiry are also confirmed by the many calculations which I have made regarding the expenditure and income of raiyats in different villages. It is needless here to give all these figures, which tell more or less the same tale of the state of indebtedness among the raiyats. I shall therefore satisfy myself by giving one example, showing the earnings and expenses of the family quoted in the preceding sections of this Chapter. The area of the holding of this family measures 10 máns. The expenses of food and clothing have already been shown in Sections (*b*) and (*c*), and are reproduced in the statement given below together with other items, which go to show that the man falls short of his income by Rs. 17 for his ordinary expenses only. To these must be added extraordinary expenses, such as those incurred at births, deaths, marriages, and religous festivals, and the interest to be paid to the mahajan, amounting to about Rs. 18 as an yearly average. Thus there would be a deficit of Rs. 35 throughout the year, which has to be borrowed from the mahajan in money and kind.

Income per annum of raiyat holding 10 *máns*[*] *of land.*

	Rs.	A.	P.
6 *Máns* sarad dhan, yielding 6 large bharans, at Rs. 10 per bharan	60	0	0
4 *Máns* biali dhan yielding 4 large bharans, at Rs. 10 per bharan	40	0	0
Straw of above dhan, chiefly sarad	18	0	0
1⅛ *Mán* birhi, yielding 75 gaunis, at 5 gaunis per rupee ...	15	0	0
1 „ muga „ 40 „ „ 4 „ „ ...	10	0	0
1¾ „ kulthi „ 120 „ „ 10 „ „ ...	12	0	0
Total ...	155	0	0

Ordinary expenses per annum of above raiyat.

	Rs.	A.	P.
Clothing for five members of family (*vide page* 32) ...	11	4	0
Valuation of food for five members of family (*vide page* 31) ...	90	0	0
Rent of 10 *máns* of land at Rs. 3 per acre	20	0	0
Cost of day-labourers (*in kind* and *money*)	24	0	0
Wages of washerman, barber, carpenter, &c., in kind and money	2	0	0
Purchase of baskets for paddy, dung, &c.	0	12	0
Feed of one pair of bullocks	12	0	0
Hire of bullocks for agricultural operations	12	0	0
Total ...	172	0	0

Apart from the greater liability of the country to storms, floods, and droughts, and the want of foresight among the Uryas through which large sums of money are spent on marriage and other domestic ceremonies, there are some other causes which lead to their contracting loans. The mortality among cattle, which, as far as reliance is to be placed on local statistics, is greater in Cuttack than in any other district of Bengal, constitutes a frequent cause in retarding the progress of prosperity, and in compelling a good portion of the agricultural population to fall into debt, and when once in debt, not even can a good year enable a raiyat to liquidate it. The larger outturn of his harvest may help him to pay off his old loan partially or wholly; but then his stock of food is proportionately reduced, and he is obliged once again to fall back on his mahajan.

Remarks and suggestions.—Statistics of rent suits (*vide* appendix) go to show that the feeling between the landlord and tenant has greatly improved of late, but there can still be no doubt that some good portion of the money of the raiyat is taken away in litigation, and especially is this the case in the many petty estates of the district, owned by a large number of co-proprietors, who being, as a rule, men of scanty means, men often of ignorance, aim at screwing out as much as possible from the tenant. When the part proprietors fight with each other, the raiyat suffers along with them, and when they choose to fight with the tenant, the sufferer still is the poor raiyat. The patent result of this chronic low condition of the people is that a check is put to all agricultural improvement. However much the raiyats may understand the necessity of the liberal manuring of their lands, and the better housing and feeding of their cattle, the very want of capital at the commencement prevents their indulging in any dreams of making their lands more remunerative by the adoption of improvements. At the present moment in Cuttack, when the country is being settled after a period of sixty years, a great check is put on agricultural improvement by the dread of the enhancement of rents. Leaving this aside, however, as only a temporary factor in hindering the progress of the country, it would seem that what is needed for improvement in agriculture is capital. Some plan must be established of offering pecuniary help to the peasant, on terms which will relieve him of the responsibility and burden of yielding to the high demands of usurers. The necessity has been felt of establishing agricultural banks in many European countries, and the benefits accruing from their establishment have been fully appreciated. A similar scheme is required here. There would be enough capital among a select few for establishing such institutions. Government would do much by offering its assistance and encouragement to such banks. The management of the banks should be so regulated, that the charges made on the raiyats may not be high, and the interests of the proprietors also secured.

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[*] A *mán* is taken in the above calculations as equivalent to about two-thirds of an acre.

The introduction of new crops and the improvement of existing crops is also a great need of the district, which may do much to alleviate the present condition of the people. My remarks on this portion of the subject will be found in the chapter on Crops.

Indebtedness of zamindars.—The zamindars of Cuttack are, most of them, men of little or no education. Their ignorance of the lands of their estates, and of the management of their zamindaris, places them altogether in the hands of some of their underlings, who deceive them right and left, and bring them to a great state of impoverishment, encumbering their estates with debts. Such has been the history of many old families who are now to be seen in a state of ruin. There are now but a few wealthy zamindars in the district. The remainder are all petty proprietors with limited incomes, whose vanity in keeping up appearances, and extravagance in spending princely sums in ceremonies, soon reduce them to a state of penury, compelling them to contract loans at exorbitant rates of interest. With the many co-proprietors of the district, the state of affairs is still worse. The income of the *zamindari* in such cases has to be divided, but the expenditure of each of the sharers is enough to swallow up the whole income. A spirit of worthless competition is raised, by which each sharer tries to outdo his co-sharer in keeping up appearances, the result being that all are hopelessly thrown into debt. Litigation though, perhaps, decreasing now-a-days is still rife among the landlords, and constitutes not an unfrequent cause of their having to mortgage their estates for the sake of getting in some money.

Forms of loan.—The loans ordinarily prevalent in the district are given below:—

Grain loans—(1) *Sawai.*—This term is generally applied to all kinds of loans of grain, and more particularly when the amount to be returned is 25 per cent. more than the quantity borrowed, this extra one-fourth being given as interest.

(2) *Derdhi*, i.e., *one-and-a-half.*—In Baisakh and Jaishti cultivators take paddy from mahajans or zamindars for food, and repay the same at harvest time with one-half the amount of grain more for interest, *e.g.*, if ten *gaunis* are borrowed, 15 *gaunis* are paid, and this independent of the price of grain at the time of contracting the loan or liquidating it.

(3) *Dwigoon.*—Cultivators often fall short of paddy (or cereals) at seed-time. They are then compelled to borrow seed from mahajans on condition of repaying twice the amount borrowed at harvest time, *e.g.*, if 10 *gaunis* are borrowed, 20 *gaunis* are repaid.

(4) *Bhaga.*—A cultivator sometimes makes over his field to another to cultivate, but himself pays the rent of the land. The party who takes the field on *bhaga* (shares), ploughs, sows and cultivates the land and reaps the harvest. The produce is divided in equal shares between the owner and the cultivator of the land. Though styled as a loan among the raiyats, it is practically a form of tenure. The cultivator really sublets his land, and his remedy in case of the conditions of the contract being broken is to be obtained under the Rent Law.

(5) *Sanjadiyah.*—This so-called loan is similar to *bhaga*, with this difference, that while *bhaga* is given out for one year only, *sanjadiyah* is given for several years at once, and the share of the owner of the land is not just half of produce as in *bhaga*, but a certain fixed portion of it much less than half, which the cultivator is bound to pay to the owner, whether he reaps a bumper crop, or an average one, or none whatever. For instance, if a *mán* of land produces an average of one *bharan*, the cultivator is bound to pay the owner of the land, say, half a bharan every year, whether he reaps a full crop or none at all. The owner pays the rent of the land.

(6) *Dadani.*—Money is lent to cultivators before or at seed-time, on condition that the same will be repaid in grain at harvest time at the rate of so many *gaunis* per rupee, whatever may be the current market rate of grain at harvest time. It may be more or less than the stipulated rate, and the cultivator may be either the gainer or loser by the transaction. Seed instead of money is also lent on these terms.

Money loans—(1) *Runa, Karajah, or Tamasook, called also Saddha Tamasook or Khali Tamasook,* i.e., *a bond without any mortgage.*—Money is lent by mahajans on written stamped bonds (which are often registered) at rates of interest varying from Re. 1 to Rs. 3-2 per cent. per memsem, *i.e.*, from Rs. 12 to Rs. 37-8 per annum, according to the amount borrowed, or the grasping disposition of the lender. The larger the principal, the lower is the rate of interest likely to be. In rare cases, it may come down to 8 annas per cent. per mensem. But this can only be hoped for on very considerable sums. Low rates of interest are sometimes taken when the transaction is between members of the same caste. At every renewal of the bond, the unpaid accumulated interest is added to the principal. Thus it sometmes happens, that an original debt of Rs. 40 incurred, say, in 1880 is cleared away with Rs. 160 odd in 1885. I was told of a case where a debt of Rs. 100 stood at Rs. 600 at the end of about ten years, even after paying certain sums of interest in the interval.

(2) *Hatudhari or roka.*—This form of lending money is prevalent in the district chiefly among the lower classes. Small sums, not exceeding Rs. 10, are lent on interest at one anna (sometimes two, and even four annas) in the rupee per mensem, payable in advance. No written bond or receipt is usually given in such cases.

(3) *Jamin-tamasook.*—A third party enters into an agreement at the foot of the bond accepting the borrower's liability as his own, should he fail to pay, or should it so happen that the amount cannot be realized from his estate.

(4) *Bandak or Rahanbandak.*—This is the general system of mortgage in vogue, for which interest is charged by mahajans at 6 pies per rupee on mortgage of all kinds of property, chiefly gold and silver ornaments and brass plates.

(5) *Dakhali bandhak.*—Land is mortgaged on the following terms. The mahajan lends the money and keeps the land. He pays the rent and enjoys the produce of the land so long as it is not redeemed, but receives no interest on the money lent.

(6) *Kautkabala.*—Money is lent on mortgage of land or other valuable property on condition that if the property be not redeemed within a certain time which is fixed, the property becomes the mahajan's, and the mortgagor has no further claim on it. If the mahajan institutes a civil suit for legal possession of the property, the court usually allows six months' time for liquidation of the debt, failing which the transaction is confirmed, and the mortgaged property legally becomes the mahajan's.

Cattle and poultry loans—(1) *Dwigodia*—A calf (bull or cow) is purchased for, say, two rupees. The owner makes it over to another person to rear it, and, when grown, to sell it at the market value. When sold, the owner recoups his original outlay of two rupees, and the balance is divided in equal shares between both parties, *e.g.*, if the cow or ox is sold for Rs. 10, the owner receives Rs. 4 plus Rs. 2 the price he paid for the calf, and the rearer gets Rs. 4.

(2) *Adhyari.*—A cow is given by one person to another to be reared on condition that the cow will in due time be returned to the owner after the rearer has taken his share of one calf, and enjoyed the milk also. Fowls are also treated in this way. The hen and one-half of the brood of chickens come back to the owner of the hen, and the other half of the chickens go to the rearer. The word "adhyari" means "half and half."

(*g*) *Conveyances.*

(1) *Boats.*—The canals and rivers of the district being largely used both for passenger and goods traffic, boats are resorted to for the conveyance of articles of trade, and especially so during the rainy seasons, when some of the district roads are quite impassable. Several kinds of country boats may be seen on the water, of which the most important are the *malingi*, the *kusuri*, the *balianta*, and the *katua*. Of all these the *malingi* draws the greatest depth of water, and is the widest. It has a length of 30 or 35 feet, and a width of 12 to 14 feet, and draws 5 feet of water. It is capable of carrying a load of five to six hundred maunds. A good new boat of this kind is valued at Rs. 300 to Rs. 400. The articles carried in it consist of paddy, rice, grains of all kinds, molasses, and

other light goods, as, being broad, when laden with heavy articles it can make very little headway against a strong current. The rate of travelling by these boats does not exceed six to eight miles per diem. Smaller *malangis*, about 25 feet long and 5 feet broad, are also used for fishing. The *kusuri* is a more useful boat, as, being long and narrow, it is able to make its way against the current at all seasons of the year, running ten to twelve miles per day. It carries about the same load. The cargo consists of grains of all kinds as above mentioned, as well as heavy articles, such as stone. The length varies from 50 to 70 feet, and the width from 8 to 10 feet. The depth of water drawn by the boat is not much over 1½ feet. Five men are generally employed to work the boat. The *balianta* is similar in all respects to the *kusuri*, only that its prow and stern are higher. The *katua*, as its name implies, is a dugout. It varies in length from 15 to 30 feet, and draws a depth of about one foot of water. The larger *katuas* can carry about 40 maunds of goods; and are used for fishing as well as for the conveyance of paddy, rice and salt. All the above-mentioned boats can also be used for passengers.

The oars of these boats differ in length, according to the size of the boat, from five to seven cubits. It is only with the current or in mid-river that they are required. In shallow water and against the current long pieces of bamboo are used as propellers, while the boat is dragged along at the same time by means of ropes by men on the banks. The helms go under different names, such as the *sukan* of the *kusuri*, the *mandhura* of the *malingi*, and the *kerole* of smaller boats.

Boats, however, are not generally used for carrying timber, which is conveyed from one place to another by being floated down on water. When several pieces of timber and bamboo are tied together they form a regular flat, and can be used thus for carrying other goods.

For carrying passengers and cattle across canals, floating pontoons are placed at certain distances, which are worked across by the passengers themselves. No further remarks need be made about steamer communications, which have been referred to in another part of the report. With cargo boats they aid considerably in the carriage of the goods traffic of the district.

(2) *Bullock carts.*—These are used as a means of conveyance throughout the district. Some of them are made of wood, while the smaller carts are generally constructed of bamboo. In appearance, durability, and carrying capacity they do not differ from the carts of other districts. Some of them, however, are to be found only in certain parts of the district without wheels, and are known as *khaooruhs*. The framework of these carts incline from the yoke of the bullocks right down to the ground at the back. They cost altogether about 12 annas in their construction, and are capable of carrying loads up to a weight of 3½ to 5 maunds.

(3) *Pack bullocks.*—These are to be seen in district and village roads, being chiefly used for the conveyance of grain to and from the marts of the district. The load carried in this style varies from two to three maunds. Such loads are also carried in *banghis* or in *baskets*.

(4) *Palkis, carriages, ponies, and elephants.*—All these are used for the conveyance of passengers. The last two belong only to private individuals. Carriages may be hired alone in Cuttack town, while palkis are available in different parts of the district.

SECTION 4.—*Movements of the Agricultural Population.*

Emigration and Immigration.—An account of the emigration and immigration of the district will be found in Appendix IV of Chapter XI. The system of temporary emigration which prevails seems to be attended with success, in as far as the emigrants return richer men than when they leave their villages, and is an argument in favour of encouraging a more permanent system of emigration, by which the pressure on the land may be relieved, and many starving families made more comfortable.

Internal movements.—The only internal movement of any consequence is to and from the irrigation works, while a few also sometimes come into, or go out from, the district during the harvest time for field-work. Some, again, go up into the Garjats during the rains with the object of cutting wood for cooking, and building, and a few during winter for the purpose of buying tusser cocoons for silk weaving.

A large number of pilgrims also pass through from all parts of India on their way to the temple of Jagarnath, and there is a further tendency internally to move towards Jajpur, Bhubaneshwar, and other sacred places in the district in addition to the great movement to Puri. Thirty years ago the pilgrims poured in almost exclusively along the Trunk Road, their numbers being largest during the *Dol* and *Rath Jatra* festivals. But since the opening of the Chandbali line a great portion of the journey is done by water. Every week brings and takes away a host of such pilgrims. On landing at Chandbali, those that can afford it take the canal steamer to Cuttack, whereas a large number select to step it out on the Cuttack and Chandbali district road. From Cuttack, the last portion of the journey to Puri is done walking, a few indulging in carts. Jajpur and other sacred shrines divert a good many who wish to pay their homage at all the sacred temples of the country. The Orissa Coast Canal steamers also bring a large number of pilgrims. In addition to this great movement of pilgrims who come by water, there is a small rush by land from the Central and North-Western Provinces. The devotees from these parts, who cannot afford to come *viâ* Calcutta, take a straight cut through the hills of the Tributary Mahals, in spite of the up-hill and down dale work, which entails great suffering, and taxes to an extreme the strength and energy of the pilgrims, many of whom naturally succumb.

SECTION 5.—*Village organization, village officials, and village disputes.*

(*a*) *Ancient village organization.*—Under the ancient Rajas of Orissa, as was the case in other parts of the province, so in Cuttack, the main portion of the district was divided into several circles or allotments known as *bisis* or *khands*, which were superintended over by two officers known as the *bhisoi* or *khandadhipati* and the *bhomiul.* The former of these had the chief superintendence and direction of affairs, and conducted the police duties with the aid of an officer called the *khandait*, and the latter was an accountant of the Karan caste, who superintended more immediately the collection of revenue, drew up the accounts of prouce and cultivation, and kept a register of all the particulars of lands. Intimately connected with this fiscal system was the village organization, as we find that each fiscal division consisted of several villages or *grahms*, and it was the village which was the rural unit of the province. The chief officials in the village were—

(1) The *padhan* or headman.
(2) The *bhoi* or accountant.
(3) The watchman, whose duty it was to protect the persons and properties of the villagers and to carry out the orders of the headman.

Though both the headman and the accountant were responsible for the revenue matters of the village, it was the former who stood out as the central figure. He was not only an official, but a representative of the people. He represented the Sovereign among his fellow-villagers, and their mouthpiece to the State. He was elected by the villagers themselves, and his position was confirmed always by a mere tacit recognition by the Sovereign. To him was entrusted the distribution of land among the villagers, as well as the distribution of rent, and he, as has been already stated, was responsible for the revenue of the land comprised in the village. He gave away to each resident or *thani* cultivator as much as he could till, and the rest, if any was left, was distributed to the *pahi* or migratory husbandmen. The rights of these two great classes of husbandmen, together with the changes that have taken place in their position and privileges, will be better discussed in the chapter dealing with the land tenure system of the district. For the purposes of the present chapter it will be enough to compare this ancient organization with what holds now in the different villages of the district.

(*b*) *Present village system and village officials.*—When the British took over the province, in addition to the above two classes of raiyats, there were also found a class of villagers who held their lands rent-free (*e.g.*, some of the present charitable or religious tenure-holders, and service tenure-holders), and a fourth class comprising the handicraft men and landless men of the village. Among the religious tenure-holders may be mentioned those who enjoyed their *brahmottars* and *debottars*, two *lakhirajes* which seem to have existed prior to all recorded accounts, but as such holders do not necessarily form part and parcel of a typical village community, nothing further need be said of them here. The fourth class chiefly consisted of artizans, shopkeepers and unskilled labourers, who though still keeping to villages have established themselves largely in towns and other commercial centres. Every village has still its mahajan, who from a shopkeeper has raised himself into a corn dealer and a banker. Among the artizans may be cited the weaver, who is still to be seen in many villages. There is also the unskilled labourer. But all these do not rightly fall into the discussion of this chapter. I shall therefore go on to another class mentioned above, viz., the service-tenure-holders, who now form the chief village officials and servants. The *pradhan*, who has always been such an influential man of the village, is now scarcely to be found in the district, though many bear that title whose predecessors had performed the duties of a headman. It appears, however, that traces of this class still exist holding jagirs and maintaining their influence in some parts of the western frontier, as in Madhupur, Sukinda, Balarampur, Kalkala, Darpan, Dalijora, Chausatipara, Pachikote, and Dompara. Among village officials, there still remain the *paik*, the *khandait*, the *chowkia*, and the *patwari*. Besides these, there are also the rahbar, ghat manji, barhai, kamar, kumhar, bhandari, dhoba, mihtar, and the naik, all of whom form prominent members of the typical village community.

The position of these members of the village, their rights and duties and emoluments, showing the respective part each plays in the village community, are now described.

The nature of the duties of the *paiks* and *khandaits* is given in full by Mr. Lacey, the District Superintendent of Police, in a letter dated Cuttack, the 17th April 1875, and I can do no better than reproduce his ideas on the subject. Writing of the duties performed by them, he states:—"They were undoubtedly originally a body of men analogous to yeomanry men, who, in consideration of rendering certain military services to the ruling power, as the exigencies of the time and State demanded, lived in the enjoyment of certain lands. These lands they retain, whether in tact or not I am unable to state. The peculiar service for which the grants of lands were made is of course no longer demanded, so that now the duties devolving upon this force are of a somewhat anomalous character. They are undoubtedly, under the English rule, what may be termed a branch or arm of the village police, and in some instances perform duties in all respects identical with those discharged by regular police, attending at police-stations for given periods, from one to seven days at a time, for the purposes of carrying official correspondence, escorting small sums of money and officers on tour in the district. They are called upon to, and do, assist the police in preserving the peace and bringing information of offences. In a word, as stated before, some of those being near stations on the main lines of communication do regular police patrol duties in turn with constables of the regular police and road chaukidars. In some few instances they are to all intents and purposes village chaukidars, generally assisting in the watch and ward of a village, the size of which is such as to call for the services of more than one man to look after its watch and ward."

The chowkia is a very old institution, and seems to have existed ever since the formation of village communities. In a preceding paragraph it has been shown that he was the village watchman, whose duty it was to watch over the persons and property of villagers, and he still continues as the village watchman, and does his work under the direct supervision and direction of the regular police. He apprehends criminals, gives notice to the police-station of bad characters in the village, gives information of deaths and offences in the village, presents himself from time to time at the police-station, assists also in measuring land with the rod whenever any land disputes occur, and performs little duties of a miscellaneous nature, supplying all kinds of information that may be required by the Magistrate. These *chowkias* were originally called *dandwasis* (staff-holders) or *chhatias*, the latter designation still adhering to them in some parts of the district, *e.g.*, as in the Banki estate and in Dompara, south-west of Cuttack. They hold very small assignments of land in jagir, and support themselves mainly on these. They are generally of the lowest class, chiefly *Pans and Kandaras.* Though servants to the zamindars, they perform services to the public and to Government. *Paiks*, *khanduits* and *chowkias* were all watchmen, and it was to the watchmen generally rather than to the *chowkias* alone that the name *dindwasi* was applied. The title has, however, now become obsolete. The *paiks* had over them a superior class of officers or *sardars*, who were called *khandaits.* They are generally descended from the Rajputs, and are supposed to supervise the work of the inferior watchmen, but very little or nothing is practically done by them. In few villages, however (*e.g.*, Balikuda in Jagatsingpur), where the number of *chowkias* is not sufficient, *khandaits* do their work.

All the above classes are remunerated by grants of land in addition to gifts of *halabiras* or bundles of paddy from the raiyats. The number of *paiks* and *khandait* officers is now very limited.

The patwari is the village accountant, or *bhoi* of olden Hindu times, by which name he is still known in some parts of the province. He kept the village register and accounts, delivering the same from time to time to the pargana *kánungo.* This latter official is the same as the old divisional accountant, and his duties now under Government are to keep registers of all rent-free tenures in his circle, to report all lapses or escheats, to make measurements and demarcations when required, to cause the attachment and sale of property legally distrained, to report the deaths of intestate and heirless landholders, to execute the orders of the Court of Wards, to make partitions, to aid in the collection of rent of khas mahals, to receive collections of road cess, public works cess, and sometimes of income-tax, to issue notices of income-tax, to do canal revenue work, to report the death of pensioners or securities of Government officers, to publish proclamations and realize fees authorized by law, to keep standard weights and measures, to report on breaches of embankments, to submit crop reports and price currents, and to report on the occurrence of droughts, inundations, and other calamities, and on epidemics and infectious diseases affecting men or cattle, to report when required on local boundaries, on articles of produce, rules and customs, and on all other matters relating to his circle, as the district officer may from time to time require. The *sadar kanungo* has his head-quarters at the Collectorate. He exercises a general supervision over the circle *kanungos*, of whom there are 25, checking their figures and returns. Like all the circle *kanungos*, he is a Government official. To return to the patwaris, it should be remembered that they have ceased to be village officials in the old sense of the term. They do not consider themselves as attached to any particular estates or villages, but do work for the zamindar and Government alike. As the accountants of zamindars, they enjoy land assignments free of rent, their jagirs having been provided them at the last settlement of Orissa. In Government work they are subordinate to the circle or *chakla kanungo.* They take copies of the *patta*, &c., of important papers from the zamindar's *scrishta* for submission to the Collectorate. They attend the office of the *kanungo* about twice a month regularly to assist him in his work of serving notices, collecting rents, &c. Their services have been utilized for census work, and at present are being utilized for the survey of the district.

The rahbar is the road guide, belonging to a class of superior officers of the State, whose tenures were created under the Mughal administration at the beginning of their rule at a time when, being new to the country, they greatly needed the services of persons who would readily show routes, communications, and stations.

The ghat manji is the ferryman of the village, whose duty is to cross over cultivators and all passengers at ferry ghats. He is generally of the fisherman caste, viz., a *Rari.* Two or three bundles of paddy, yielding about three or four seers of grain, are given as remuneration by each family to him.

The barhai or carpenter, like the *kamar* or blacksmith, has no particular duties or influence in the village apart from his trade. The *barhais* do the wooden portion of the work in making and repairing ploughs and other agricultural implements required by the villagers, for which they are paid generally in kind, getting three to five seers of corn from each raiyat per annum. When their services are required for building *sarkari* houses, they are supposed to work on the wages of a ticca labourer (*i.e.*, about six pice per day) which serves as their *khoraki.* The implements used by them are the *bársi* (axe), *nehana* (chisel), *mugura* (mallet), *karata* (saw), *kunda* (turner's rod), *batali* (broad chisel), *randa* (plane), *bhara* (awl), *ruha* (file).

The kamar is the blacksmith, who looks to the ironwork of all agricultural implements, with emoluments similar to that of a carpenter. His instruments are the *nehái* (anvil), *hatura* (hammer), *sandnasi* (pincers), *cheni* (cutter), *sala-ankuri* (iron-poker), *sahana* (large file), *ruha* (file), *bhatti* (bellows), *bindhini* (punch).

The kumhar or potter is the manufacturer of all the earthen pots of the village. He is bound to supply handies whenever necessary. For handies carried to the zamindar's cutcherry the potters receive *khoraki* for every load carried by them. All earthen vessels during festivals are supplied by them. For baking their pots, they have the right of bringing wood free of payment from the jungles, and can take earth on the same condition from tanks, jheels and rivers. To raiyats they sell their pots, and do not enter into an arrangement for supplying the village.

The bhandari or barber holds a very important position in a village. He shaves the villagers, and performs all the ceremonies necessary at births, deaths, and marriages, and for these duties receives appropriate presents. He shaves the new-born infant for the first time, three or four months after its birth, and for this receives about three seers of corn. Then, again, he assists at the marriage ritual, and is paid similarly in kind. On the 10th day after the death of any member of the family, he is called in to shave all the male members, for which he is remunerated with corn. In addition to these duties under the old Rajas, as was the practice in Kujang, the barber was required to serve as a general servant for one month at a time to every *amla* who may wish to employ him, and his only remuneration for such service was his food. The local names for his professional instruments are as follow:—*Muthi* (leather case), *khura* (razor), *nahurini* (nail-cutter), *naknasi* (nose pincers), *sanapathara* (sharpening stone), *katuri* (scissors), *darpana* (looking glass), *sanachamra* (leather strop).

The dhoba or washerman is engaged in washing the clothes of the villagers. They wash the clothes with *kharpani* (*i.e.*, water mixed with ashes), and then boil them in large earthen pots filled with water and covered with a *palam* or earthen saucer. After being thus boiled over a *chuli* (furnace), the clothes are taken out and beaten on a flat board (*patta*), and then wrapped round a wooden pole (*khunta*) and well twisted until the water is wrung out thoroughly. The clothes are now washed a second time in clean water and then spread out to dry in the sun. After births and deaths, when the purificatory rites are to be performed, the *dhoba* washes the clothes of the family, for which he receives a special fee, which, as in all other cases, varies with the position of the donor. The presents include such articles as paddy, rice, oil, turmeric, *ghi*, &c., as would appear from the following, which gives an idea of what a *dhoba* gets under ordinary circumstances:—

(*a*) On the birth of each child	10 gaunis paddy. 1 powah oil. 5 powahs turmeric. 2½ gaunis rice.
(*b*) For each death in the village	5 gaunis rice. 6 chataks oil.
(*c*) For each marriage	2½ gaunis rice. 1 powah oil. 1 chatak ghee.

In addition to their professional duties, the *dhobas* sometimes supply firewood for the zamindar's *cutcherry* or office, walking in turn to bring wood from the jungles, for which it appears no remuneration of whatever kind is given. The fact of their having *jagirs* should not interfere with remuneration for additional labours, and as the work of getting wood is by no means an easy one, wherever thus employed, they well deserve their *khoraki* of four to six pice per day.

The mihtar or sweeper belong to a very low caste. He removes all unclaimed corpses, and dead animals to the *bhagar* (and in removing the latter puts himself in possession of their skins).

The nayak is the astrologer and fortune-teller of the village. He prepares the horoscope of the new-born child, and is consulted on all auspicious occasions. For his services, he is usually paid in fees varying with the means of the donor.

All the above officers, it should be mentioned, are remunerated by grants of lands, which they hold therefore as service tenures, varying in area from six *gunts* to one *mán*, some of them comprising cultivated and others only homestead lands. Besides these, however, in different parts of the district there are men also of other castes who enjoy these *jagirs*, and who, being found in very many villages, may well be included among those personages who, though not village officials, figure prominently in many village communities, *e.g.*—

(*a*) *The Chamars*, who in return for their service grants, supply palm leaves for the preparation of office records and make mats whenever required.

(*b*) *The Gokhas*, who are a lower caste of fishermen, and in addition to their own profession often supply firewood when required for festivals, and do the work of carrying wooden posts and canes from the jungles for the repair of the houses of the estate to which they belong.

(*c*) *Domes*, who beats drums on festival days and supply baskets when ever required.

An account of the Guryas (confectioners), Telis (oil-pressers), Tantis (weavers), Gawallas (milkmen), Baniyas (goldsmiths), and other artizans and trader classes who also form conspicuous figures in villages have been given in other chapters of this report.

(*c*) *Village disputes.—Hindu panchayets.*—Family disputes among the raiyats are almost always decided by a *panchayet*, the members of which are *bhalalokes*, *i.e.*, men who are supposed to be the respectable men of the village. Very often it, however, happens that these *bhalalokes* are persons of no education and conscience, but simply wealthy and influential members of the village, who with interested and mercenary motives are scarcely fitted to sit in judgment. Officers of the zamindar's cutcherry, and subordinate Government officers, such as *kanungos* and their chainmen, are sometimes included as members. There is no regular president or casting vote in this assembly, disputes being settled by the acceptance of the verdict of the majority. When opinion is equally divided, the matter has to go up for arbitration before another court. The *Paharaj* or priest acts as judge in this higher court, and the *panchayet* is summoned to sit as jury. Evidence is then duly taken, and judgment delivered by the *Paharaj* on the authority of the *Puranas*. The degree of guilt is expressed in annas and pice, and punishment is awarded in the shape of fines which are spent in making offerings to the village gods. The offender has in many cases to feast Brahmans, members of the *panchayet*, and all his relatives and friends according to the extent of his guilt. Should the defendant be acquitted, a vote of censure is passed on the complainant. When raiyats are reluctant to go to court, disputes over moveable and immoveable property are referred to *panchayets*. Purely social and caste disputes are settled by *panchayets* consisting of members of the same caste, though sometimes they are submitted for decision to men of other castes, in which latter case the assembly is styled the *barapatak*.

Infringement of caste rules is punishable with boycotting, the men thus outcasted not being allowed the services of the priest, barber, or washerman during the period of their excommunication. Boycotting, curiously enough, is very rigidly carried out by low-caste people like carpenters, fishermen, and confectioners. Re-admission into caste is always accompanied by heavy expenses. In grave offences, a pilgrimage to Jagarnath is in some cases indispensable, in addition to all the feasting to Brahmans, caste people, relatives and friends. The *Gawalla* caste have their *gosain* at a place called Nembah, who himself is a *Karan baishnab*. This man is regarded as a Chief Justice by all the *Gawallas* of Orissa, the Tributary Mahals and Khurda excepted. Corporal punishment is also sometimes awarded for criminal offences.

Muhammadan panchayets.—In every village or bazar of a town, a respectable man is appointed by the Muhammadan residents of the place as their headman, who is commonly designated the "kili misur," a corruption of "kilid-i-missr," *i.e.*, the key of the town. Complaints of the following nature are usually laid before him:—Petty assaults, insult, adultery, non-payment of debts, and other civil disputes, such as the sharing of ancestral property, &c. On receipt of a complaint, generally oral, the headman demands the peon's fees varying from two to eight annas, which has to be deposited duly. A day is fixed for the *panchayet*, and the peon or *piadah* goes round to the principal residents of the place as well to the parties concerned, informing them verbally of the nature of the charge and the time and place of the meeting. The decision of the *panchayet* is the decision of the majority, and the punishment inflicted on the guilty person generally takes the shape of a small fine which is utilized in providing a dinner or a luncheon of sweetmeats for the members of the *panchayet*, unless some compensation is thought necessary to be given to the aggrieved party, in which case the whole or part of the fine is given away as compensation. Corporal punishment is sometimes awarded in cases of adultery by means of a cloth twisted to a rope. The delinquents, when permissible, are united in marriage.

Panchayets among the native Christians.—Family and social disputes amongst the Baptist Native Christians of Cuttack are usually settled by a *panchayet* consisting of a Secretary, who is also the President, and from four to eight members, according to the gravity of the issues involved, who are appointed by or with the approval of the missionaries. A complaint is made to the Secretary, either oral or in writing, accompanied by a fee of 4 annas. The Secretary enters the complaint in a book kept for the purpose, fixes the day and place of meeting, and issues notices to the members of the *panchayet* as well as to the parties concerned, and, if need be, to their respective witnesses. The place of meeting is often the hall of the Mission College, but some other place may also be selected to suit the convenience of parties and witnesses. On the evening of the day fixed, all persons interested repair to the place of meeting. The fee of 4 annas referred to above is intended to cover the remuneration of the bearer who takes the notices round, the charges for stationery and other contingencies, any balance being retained as a fund which is utilized for the benefit of the community. Before commencing the proceedings the parties are required to deposit a fixed sum of money with the Chairman according to the gravity of the case, and the means of the parties, varying from a few annas to a few rupees. The witnesses are then heard and their depositions briefly noted. After all the evidence has been taken, the parties and others are required to go aside, and the *panchayèt* sits with closed doors to deliberate. The deliberation over, the parties are recalled, and the *panchayet's* decision, which is the decision of the majority, is made known, and the guilty party is usually punished by a fine amounting to a sum usually within that already deposited, if not the whole of it, which is forfeited. In most cases the offender is also brought under church discipline on the recommendation of the *panchayet.* Civil disputes are settled in the same way, but without the cash deposit required in assault and other petty criminal cases.

SECTION 6.—*Day-labourers.*

The people of the district may be broadly divided into two classes, viz.—

(1) The landed classes comprising the zamindars, intermediate tenure-holders, and the great mass of cultivators, including persons, almost of all castes.

(2) The landless classes, including artizans, traders, shopkeepers, fishermen, boatmen, many of whom have been obliged to combine agriculture with their own profession, and some of the lowest castes who serve only as labourers or *muliyas.*

The labourer or *muliya* classes are chiefly recruited from the Pans, Sahars, Bauris, Kandaras, and other low castes, and even include many poor men of higher castes, such as the Chasas. Their numbers seem to have considerably diminished during the famine of 1866, but of late years there has again been a steady increase. With the increase of population, and the consequent competition for land many are obliged to seek for a living by working as hired labourers. Some of these are engaged purely for the cultivation of land, while others serve as coolies to carry loads, or find employment under the Public Works Department, or perform odd jobs in villages, such as assisting in the construction and repair of huts, &c. Of the latter those engaged in *sarkari* work are more or less well off, as they are paid good wages, but those who seek odd jobs in villages are generally in a very bad condition, being never certain of securing work every day, and earning only about five seers of paddy or five pice per diem without any additional perquisites, even when successful in being employed. Hired agricultural labourers are of three kinds, viz.—

(*a*) *The baramasiya* labourer engaged for *barámas* or 12 months, called also the *chakar* or servant. He receives both board and lodging in his master's house and four garments every year, viz., two *dhutis*, one *gamcha*, and one *chaddar*. His annual wages amount to Rs. 15, which is given in two or three instalments, the first amounting to Rs. 6 or Rs. 7, being paid on the day he is engaged, *i.e.*, on the *Dol Purnumi* day in the month of Falgun. On this day he also gets a present of two annas. There is no written engagement entered into of any kind between employer and employé.

(*b*) *Nagá muliyá or haria muliyá*, who is also a yearly servant, like the *baramasiya*, but does not receive his board and lodging at his master's house. He receives a *gauni* of five seers of paddy every day, besides an annual present of a winter *chaddar* and *gamcha*. When paid in money, he gets four to six pice per day. In addition, he is allowed a plot of land about five or six *gunts* in area called *hetabari*, to cultivate for his own benefit free of rent. If this free assignment of land be not made, he gets from Rs. 6 to Rs. 15 as his wages for the year, the amount depending upon his working power and skill, and the circumstances of the employer. An advance is also made him of Rs. 5 or Rs. 10 or more, on the day of his engagement, which is to be repaid by him without interest at the completion of his service. The contract between employer and employé is made as usual on the *Dol Purnumi* day on palm-leaf. It takes the form of a bond or *tamasook*, which is signed by two or three witnesses, by the writer of the contract, and by the employé. Should the employé fall short of his terms and escape with the advances, a legal process may be taken against him in the Civil Court, the palm-leaf contract being considered binding under the Stamp Act on the payment of a fee. In some places the contract is now made on stamped paper for the greater security of the employer. At the time of harvesting, the *nagamuliya* has special rates (*khará-uta*) for his wages. For instance, for the rice crop he gets paddy valued at about three or four annas, for the pulse and rabi crops generally he gets grain valued at three annas, for tobacco about three annas, and so on. Sometimes the labourer instead of binding himself for a year, makes a contract for six months of the year. He is then styled *adhamuliya* or *adhakutiya* (*i.e.*, half a *barámasiya*), and gets half the perquisites. The contract, like that of the *nagamuliya* proper, is a *tamasook*. This same kind of contract is also entered into by the *halapaliya* (*i.e.*, driver of the plough). The bullocks and plough belonging to the employer, he engages merely to plough the land, getting Rs. 3, Rs. 5 or more according to the number of working days in the year. Harvesting wages in some places is given according to the amount of paddy cut per day, one-sixth of the quantity reaped being generally taken by the labourer.

(*c*) *Ticca muliya or dandimuliya or upari-muliya*, who is a labourer engaged and paid per day either in kind or money. His remuneration rarely exceeds five, six or eight pice per day. When given paddy, the amount varies from five to ten seers.

It is said that the number of agricultural labourers amounts to about 25 per cent. in large villages, composed chiefly of *nagamuliyas*, there always being a large proportion of wealthy cultivators, as well of such castes as *Karans* and *Brahmans* who carry on their cultivation by hired labour. In smaller and poorer villages the percentage is said to be greater; but the men here are all *ticca muliyas*, there being few or none in such villages to be able to afford permanent servants. There are also a good many people in the district who having small allotments of land of their own, or not being able to do much in their own profession, give all their extra time to seeking for work as day-labourers. The material condition of the labourers as a class cannot be said to be satisfactory. In severe famines, having generally no land to fall back on, they are the first to suffer. The hard time of the year for them to get over is that before the harvest when stocks are low, while the months they are well off are those which fall during the harvesting season.

CHAPTER III.

SECTION I.—*Climate.*

Duration of seasons.—The climate of Cuttack is similar to that of the southern districts of Bengal. The year is divided between three distinct seasons, each having its own characteristics, viz., the hot, rainy, and cold seasons. The hot season or summer commences in March (*i.e.*, about the second week of Falgun) and lasts till the middle of June, when the Ashar rains set in. The duration of the rains is from the second week of June to the end of October, comprising a period of four-and-a-half months. In some years, however, the rainy weather commences earlier, and in other years later. This year, the first monsoon rains did not begin till the end of June—a fortnight later than the usual period. As a rule, the regular monsoon showers cease with October, but they have been known to continue even up to November. Though the normal fall for this month is only 1·09 inches, the actual rainfall has in some years amounted to 10 or 12 inches. The heaviest showers fall during the months of July and August, when the normal, according to rainfall records, is 12·20 inches. The cold season usually begins in November and continues on to the end of February. The climate now is generally severer in the western than in the eastern parts of the district, due to the proximity of the sea on the east coast and to the presence of hills and forests on the western frontier. The remarks made in connexion with the irregularity of the commencement and close of the rainy season apply equally well to the hot and cold weather, there being no date which can be sharply fixed as a line of division between any two seasons.

Temperature.—The two hottest months of the year are May and June. The rise in temperature begins to be marked in the middle of March, when the thermometer stands over 80° at 8 A.M. in the morning. During the whole of April the temperature at 8 A.M. keeps on the average between 80° and 85°, rising in May above 85°. From the 1st of May to about the 15th of June, the readings at the hour above mentioned are between 85° and 90°. Towards the end of June and the beginning of July, there is again a diminution in the mercury column, due to the monsoon rains. The decrease is still further marked from the 15th of October, when the cold weather begins to set in. The temperature now for a whole month at 8 A.M. in the morning varies from 75° to 80°. For the next three months, *i.e.*, up to the second week of February, the reading of the thermometer seldom exceeds 70°.

Meteorological stations.—There are two meteorological stations in the district, viz., at Cuttack and at False Point. The one at Cuttack is in charge of the Telegraph Master, and the one at False Point under the Irrigation branch of the Public Works Department. Besides these, rainfall statements are kept by the Irrigation Department at Naraj, Janapur, Jagatsingpur, Marsaghai, Jajpur, False Point, and Kendrapara.

Rainfall.—A fall of about 55 inches is generally considered sufficient to ensure good outturns. The principal crops are then enabled to spring up seasonably and to attain to maturity in proper time, provided also that the distribution of the rainfall is such as to suit the requirements of the season. An untimely and unequal distribution always causes anxiety, even if the actual fall does not fall short of the quantity required for the crops. Rice being the main crop of the district, the raiyats are altogether dependent on the rainfall for a prosperous season or otherwise, and much care and time therefore is spent on the regulation of water in their fields. The rain as it falls is carefully kept within the fields. The necessity of this operation is clearly laid down in an aphorism very commonly current among the raiyats which runs thus when literally translated :—" We must construct embankments one cubit in height and one cubit in breadth, and cover them with grass to keep in the water, for listen, cultivators, wherever there is water, there is paddy." There are also other Urya proverbs illustrating generally the importance of water to the paddy crop, *e.g.*—

"Ubha mhuti, ar du mhuti
Keari majherā, puthibu khati,
Bilérā rakhibu pani shomano
Parbatho shikorā koribu dhano,"

i.e., "when the measurement of the rainfall at intervals of two fists is found to be one fist or 4 inches, paddy will be found to grow well even on the tops of hills." Again, "Dhan panika, shona kanika," *i e.*, "As the value of gold is diminished by a mixture of other metals (*i.e.*, when there is not enough gold in the mixture), so also paddy suffers from a deficiency of rain."

Dealing now with the rainfall required in each month of the year, we find that much stress is laid by the local cultivators on the great importance of rain at the end of the month of Magh (15th January to 15th February), so as to permit the land to be ploughed and opened up and exposed to the rays of the sun during the hot season. The people say—

"Jadi barase, Magherā sesha
Dhanya se raja, dhanya se desa,"

i.e., "if there be rain at the end of Magh, it will bring prosperity to the king and his subjects." The Magh showers are also of immense value for what may be called the *khanabari* crops, *i.e.*, those grown on homestead lands, such as chillies, brinjals, *patal, karela, saru*, &c.

In the month of Falgun (15th February to 15th March) the raiyats do not look out for much rain. A dry Falgun is appreciated, so that the land may be benefited by the heat of the sun. An occasional shower in Falgun is taken advantage of to prepare the land for jute; but if the rainfall is at all heavy, the cultivators refrain from breaking up their land for jute till the weather gets drier. If rain be accompanied by hail and storm in this month, it is found very injurious to the *dalua* paddy crop, as well as to the ripening *rabi* crops when they are approaching the period of harvesting.

The month of Chaitra (15th March to 15th April) is also a hot-weather month in which rain is not required. Sometimes, however, the spring showers in February already referred to do not fall till the end of Falgun or the begining of Chaitra, when they are taken advantage of to break up the rice land, so that it may be well exposed to the sun and atmosphere before the sowing season comes round.

Moderate showers in the end of Baisakh (15th April to 15th May) and the beginning of Jaishti (15th May to 15th June) are very favourable to the growth of the *bhadoi* crops as well to that of the winter rice crop. These premonitory antemonsoon showers in May push on the *biali* and the early *sarad* sowings. They should fall only at intervals and should not be excessive, as heavy and continuous precipitation of rain at the time of and immediately after sowing proves very injurious to the young plants.

With the month of Ashar 15th June to (15th July) begin the regular monsoon showers, which last up to the middle of Kartik (31st October). This period in order to produce a good harvest should be marked by heavy rain with intervals of fine weather to enable the cultivators to carry on their weeding and transplanting operations. There is an aphorism among the Urya cultivators which states for a prosperous year, there should be during the rainy season eight days of continuous rain night and day, sixteen days of showers at intervals of an hour or two, thirty-two days of slight showers, and sixty-four of a drizzle, the vernacular of which runs as follows:—" At dumkani, sholo ashara. botrish liph lipha, chowsatti kunda jhara." As to the amount of rain required in each month, we find from the following saying:—

"Dhuli gundicha, kadua gama
Chasa bota, dhan hato purnima"

that for the vigorous growth of the paddy crop at the time of the *Gundicha* or *Rath Jatra* at the end of Jaishti or beginning of Ashar, the rainfall should be such that the soil may not become too moist, and sufficiently heavy in Bhaddra at the time of the *Gama Purnima* festival to make the land puddly.

Sravan (15th July to 15th August) and Bhaddra (15th August to 15th September) should be months of good rain, for "if it is dry and dusty now, the cultivators will have to leave their fields and run away," or as the people say—

Shukila Sravan, dhuli Bhaddra
Khetā charikeri, palai chasa."

They would have to run away too, if—

"Aswin masherā na laga kadua
Kartik masherā, ba baresha,"

i.e., "if in the month of Aswin there is not sufficient rain to moisten the land thoroughly, and if in Kartik rain is accompanied by windy and stormy weather." The same facts are illustrated in the following aphorism:—

"Karkatā, jhirkatā
Sinha sukanā
Kanya kanā kanā
Binabai jaba tula barakhā
Kanha rakhogā dhana,

i.e., "if there is rain in Sravan, and if the rain in Bhaddra is such that the water does not stagnate in the fields, and if in Aswin the rain is sufficient to allow drops of water to hang from the ears, and lastly, if there be rain without wind in Kartik, where will you store your paddy?"

Plentiful rain is especially required at the end of the month of July, this being the time when the Uryas engage in the operation of subsoiling. The plough is driven through the young plants which are uprooted and then replaced. When the rains hold off at this time, and when the river supply itself runs down to below dry weather level, so that a great strain is put on the Irrigation Department, the outlook gets very bad for the cultivator.

The rains of September and October are called "golden showers," as they materially help to harden the grain in the ear, and bring the crop to maturity in proper season, and enable the cultivators to look foward to a plentiful harvest. Hence the proverb—

"Kartik mashera danda re pani
Hatua karhiba bara gauni,"

i.e., "if the rain in Kartik is sufficient to allow water to stand in the fields, then purchasers will take with them. a large *gauni* or basket to have the paddy measured." In other words, there will be a plentiful harvest and rice will be sold cheap.

In the months of Aghran (15th November to 15th December) and Pous (15th December to 15th January) very little rain is required, as many of the pulses which are then flowering are injured seriously by heavy showers. A little rain towards the end of December and in January is useful in enabling *rabi* plants to attain their full development. Prolonged cloudy or damp weather at this time is prejudicial to all *rabi* crops, as it induces attacks of various insect and fungoid pests. In the following lines are embodied the above facts:—

"Jadi barase Maghusure,
Raja namen magane,
Jadi baraso Pouse,
Rajya jai nase,"

i.e., "if it rains in Maghusur (Aghran), kings demean themselves to beg; and if it rains in Pous their kingdoms go to ruin."

Consulting the rainfall statement given in the Appendix, where the actual and normal fall of the district for 1891 is given month by month, and reading it in connection with the facts contained in the above aphorisms, we find that in the year under question there was the usual slight rain at the end of January which to the cultivators was a good beginning to the rest of the year; but the heavy rains in March proved injurious, reducing the outturn of the *rabi* crops by damaging them just as they were about to be or were being harvested, the loss due to this cause being estimated by the Collector at 4 annas. Deficiency of rainfall at the time of sowing affected the *bhadoi* crops, the outturn of which was still further reduced by the excessive fall in August when the crop was approaching maturity.

The season was unfavourable also to the growth of winter rice. In the month of June, the actual rainfall was much below the normal. This deficiency of the monsoon showers seriously affected the outturn. Excess of rain in

August and September produced high floods and interfered with the weeding and reploughing operations. Want of rain began to be felt again in October. Rain fell in the following month and did some good to the inland crops, but the high wind and storm which accompanied these showers did a great deal of damage, especially towards the south-east of the district near the sea-coast. The loss due to this cause was estimated as ranging from 2 annas inland to 6 annas towards the sea-coast. Where the cyclone was felt, the *rabi* crops which had already been planted suffered badly; but, on the other hand, where the rain was unaccompanied by wind they benefited greatly.

Remarks and suggestions.—Rain gauges are rather scarce in the district, which is a great drawback considering that Cuttack is so dependent on the rainfall for its prosperity or otherwise. All Managers of Wards' estates, the postmasters of the more important post-offices, and the officers in charge of thanas and outposts may be supplied with gauges, and required to send in their statements to their respective subdivisional officers, who would submit them to the Collector. In this way rainfall records of all parts of the district would be had, and thus a good average obtained for the whole district.

SECTION 2.—*Soils.*

The soils of the district may be broadly divided into four classes, viz.—(1) *Matal* or clay lands, (2) *Dorosha* or loamy soils, (3) *Balia* or sandy lands, and (4) *Pattu* or alluvial soils. In addition to this, local names are given to note minor differences in the composition, as well as to distinguish soils with reference to their locality and altitude. A short account is added of the characteristics of those soils which are distinguished according to their composition:—

(1) *Matal* is the name given to all kinds of stiff clayey soils. Rice and sugarcane are the principal crops grown on them, but besides these, wheat, *birhi*, and *kulthi* are also cultivated.

(2) *Chikita* is a strong sticky clay, which is almost too stiff to be used for successful cultivation, and grows for the most part coarse varieties of the *sarad* or winter rice. The outturn on such lands is said to be generally very poor.

(3) *Chauria* is also a hard clay, which is very liable to cake on being exposed to the sun when ploughed. It generally cracks into hard blocks on getting dry, and is altogether an inferior soil.

(4) *Dorosha* is a mixture of sand and clay in nearly equal parts. It is used for *biali* or autumn rice and for all *rabi* crops. It is easily worked and is retentive of moisture.

(5) *Telbalia* is the name given to a loam which contains a larger admixture of sand than the *dorosha* lands. It is looser in texture, and being poorer, requires more manuring than a *dorosha* soil.

(6) *Baliamatal* is a loam with a large admixture of earth; in other words, a rich sandy loam.

(7) *Rangamati* is a red ferruginous sandy loam occurring near laterite rocks. Like *telbalia* it requires a great deal of manuring before it can produce a good crop.

(8) *Thenga jami* is an elevated sandy loam with very little moisture, which as a rule is allowed to lie waste, though sometimes ploughed up for growing *biali* paddy, *mandia*, and *kulthi*. The crops on such lands are necessarily very poor.

(9) *Balia* is the name given to very loose sandy soils which grow poor specimens of *rabi* crops.

(10) *Pattu* is an alluvial soil, formed from silt deposited by floods. It is used for tobacco, mustard, jute, coriander and mustard, and is taken advantage of to grow all kinds of miscellaneous crops.

(11) *Pankua* is a black mud unmixed with sand, such as is found at the bottom of ponds and tanks.

(12) *Rektimatal* is a stiff rich soil.

(13) *Pausia* is a loose though comparatively fertile soil.

(14) *Gengutia*, as the name would signify, is applied to a clay containing an admixture of *genguti* or lime, to be met with near those river beds which abound with nodulous limestone. An admixture of clay and limestone dust is in some places known as *khali* soil.

(15) *Noonajami* is land which is more or less of a saline nature. It is generally of very little use A few varieties of *lagu sarad* rice are grown on it, when it does not contain an excess of salt.

In addition to the soils enumerated above, the land, as in other parts of Bengal, is broadly divided into low land and high land. The low lands so extensively used for rice go under the name of *khal jami*, and the uplands are known as *dhipa jami*, while those situated on a level between the high and low lands are called *madhiana jami.* Such lands are not very common, and when found are used for the cultivation of the finer varieties of rice.

The low lands, also known as *jal* lands, are further divided according to their differences of level into—

(*a*) *Jari lands*, which are the hollows situated between high lands on either side of or around them, and sloping towards them, so that they receive all the water running down the slopes of the uplands.

(*b*) *Daro lands*, situated higher up on the sides of the hollows.

(*c*) *Gairha lands*, occupying a place still higher up. When a *gairha* piece of land is constantly under water fed from a stream, so that it is always wet, it is known as *jhor jami*, and is fit for growing only the coarser varieties of winter rice. When a tract of low land is situated between two ridges of uplands covered with jungles, it is called *garara.* Such land as a rule is fertile, as it receives the washings of the jungles, but the great difficulty experienced by cultivators on such lands is to keep off cattle which intrude from the neighbouring jungle.

The uplands of the village are situated for the most part at or round about the homestead, and are distinguished into—

(*a*) *Gharabari*, which is the portion of land situated immediately round the huts of the cultivators. It is, as a rule, very fertile, and though generally small in extent, is used for cultivating all kinds of vegetables, especially arums and brinjals, and such crops as jute, tobacco, *arhar* (*chaitra*), *birhi*, *mandia.* turmeric, onions, garlic, and ginger. The land round the *gharabari* is the *baritola*, being the tract occupied by ponds and tanks.

(*b*) *Gautali*, which is the furthermost portion of the village immediately before the fields of the cultivators. *Biali*, or upland rice, and several *bhadoi* crops are generally cultivated on this kind of land.

SECTION 3.—*Manures.*

The cultivators of the Cuttack district are not so alive to the beneficial effects of manuring as those in the district of Burdwan and other neighbouring districts of Bengal. There are certain conditions, under which, manuring may become prejudicial, which will be described below; but even where the advantages of a liberal treatment of the soil are quite obvious, the Uryas will not go out of their way to use manures if their ancestors have not used them. This was especially brought home to me while I was touring in a village near Singpur in the subdivision of Jajpur. The raiyats here admitted that cowdung was being used with benefit in villages a little removed from theirs, but they could not be induced to believe that their lands would be equally benefited if they followed the example of their neighbours; their only answer to my arguments being that it was not the custom among them to have recourse to any manures for their soil, and that they would prefer to adhere to their old-fashioned ways. It is not to be concluded from this, however, that the raiyats in all parts of the district are similarly minded. The narrative helps to show, and my experience of the district supports the conclusion, that there are certain parts of the district in which no manure whatever is employed, not even cowdung, where its use is certain to be attended with good results. The different kinds of manures used by the cultivators will now be enumerated. They are—

(1) Cowdung (*Gaikhatha* or *Gábárá*).
(2) Ashes (*Paúnsa*).
(3) Pig manure (*Ghúsúri khatha*).
(4) Droppings of sheep and goats (*Menda, chali khatha*).
(5) Refuse or sweepings of the house (*Ghattua*).
(6) Old thatchings (*Chana bundi*).
(7) Mud from old walls (*Kanta mati*).
(8) Pond mud (*Pankua*).
(9) Cake (*Piria*).

The list given above includes eight different kinds of manure, but, with the exception of cowdung and ashes, and of cake for such crops as sugarcane, very little use is made of manures to enrich the soil. Cowdung will be treated of first, and then the others in the order given in the list.

(1) Cowdung, *i.e.*, the cleanings of the cattle shed, is the only manure which is available in some quantity in India, and though it contains many advantages over artificial manures, yet by the indifference and carelessness of most of the raiyats, its most useful ingredients are allowed to be wasted. Such is prominently the case with the majority of cultivators in Cuttack. I have seen several small villages where no manure pits whatever are to be found near the homestead. The dung is heaped in a corner of the homestead land mixed with ashes and the sweepings of the house. No care whatever is taken in the rainy weather to spread even a mat over the heap. The result is that it is exposed to heat, wind, and rain. Gaseous ammonia is expelled, the soluble constituents of the manure are washed away, and what remains consists of hard undigested fibres, which form the least valuable portion of the manure. Even where pits are dug, very many of them are too shallow to prevent the washing away of the manure by heavy showers of rain. They are generally two feet in depth and about a yard in diameter. Larger pits, wherever seen, are intended more for the preservation of the dung to serve as fuel cakes, than as manure. Such pits are deeper and are protected from the rain by straw. They remain closed during the whole of the rains, after which the dung and straw is taken out to be converted into cakes. It is not an uncommon sight in the district to find early in the morning women and children roaming about in the fields with baskets in their hands, scrupulously gathering up every bit of cowdung, which they carry home for conversion into fuel cakes. All the dung gathered from day to day is placed in the pits mentioned above. When the season comes round for making fuel cakes, the dung is taken out and mixed with chopped straw, and then pressed with the hands into circular plates or cakes, which are plastered on to the walls or roof of the house to dry in the sun. When quite hard and baked with the sun's heat, they are taken down and piled together in beehive-shaped stacks and covered with straw. From these stacks, the cakes are taken out for burning whenever required. What should act as manure is thus converted into fuel. The ashes of this fuel, however, make up to a certain extent for the loss, being themselves useful for certain crops. When dung is used as a manure, it is applied in smaller or larger quantities to all kinds of crops. Low land paddy lands are, as a rule, manured with this material in the months of Chaitra and Baisakh. They generally receive a larger quantity of manure than the uplands, on which autumn rice is sometimes grown, without any manure whatever. When paddy is transplanted, the nurseries require and receive heavy manuring; but in this case the quantity of manure spread on the fields is much less than in the case of broadcasted paddy. Besides paddy, cowdung manure is also used for sugarcane, *pán* (*Piper betel*), tobacco nurseries, jute when sown on upland loams, *sunn* (*Crotolaria juncea*), cotton, castor, linseed, coriander-seed, *methi* (*Trigonella fœnum*), *saru* (*Colocasia antiquorum*) and brinjals. For pulses, such as *harar* (*Cajanus indicus*), *kulthi* (*Dolichos biflorus*), *múga* (*Phaseolus mungo*), *birhi* (*Phaseolus radiatus*), it is seldom or never used. Wheat and barley also receive little or nothing of this manure, and as a rule, therefore, such *rabi* crops of the district produce very poor outturns.

Whenever used, dung is applied in a well-rotten state. Dung and refuse, having been reduced and decomposed to a powdery condition, is taken to the fields, where it is spread in heaps and then ploughed into the land. To the credit of the cultivators, it must be observed that the manure, though neglected, is never injudiciously employed. It is not spread on alluvial deposits, as it has a tendency to burn up the crop. In *dalua* paddy lands it has been found to increase the amount of stem and leaf and proportionally to decrease the amount of grain. When applied to tobacco grown on land coverd with silt, tobacco plants are generally attacked with insects and yield but a weak unflavoured leaf. In all these cases, the raiyat takes care that he uses no cowdung manure. For similar reasons, it is not considered good for saline tracts, where its application induces insect pests, and tends to increase the proportion of stalks at the expense of the grain. Cowdung, not being an article of commerce, can seldom be purchased, as each raiyat uses his supply for his own fields. Whenever available for sale, however, it is paid at the rate of 2 or 3 annas per cartload of 10 maunds. Should the manure contain a small amount of refuse and a large quantity of dung, it can fetch as much as 4 to 8 annas per cartload.

(2) *Ashes.*—The ashes of the kitchen are generally thrown into the dung heap, the amount available for manuring depending altogether on the amount of fuel consumed for the household. To the kitchen ashes are often added the ashes obtained by burning leaves. When applied separately to the land, instead of being mixed with dung, it is generally spread over a stiff clayey soil, where water is liable to stagnate. It is therefore mostly used for low *sarad* (winter paddy) lands. In uplands, it has been found to have the effect of drying up the crops. Ashes are used by some cultivators for driving off red ants.

(3) *Pig manure.*—This manure is used only to a limited extent, as the pig is an abomination to all but the lowest castes. Some raiyats, however, are well aware of the high qualities of pig dung as a manure, and accordingly enter into a compact with the Pans and other low castes, such as sweepers, who keep pigs, to get their herd to fold at night on their fields. The cultivator has the benefit of all the dung dropped at night, for which he pays from two pice to an anna, according to the number of pigs, to the pigherd. The herd is brought to the fields during the ploughing season for two, four or more days according to the arrangements made with the cultivator. As the number of pigs in the district is very small, there is no regular system of manuring by this method, which is only adopted when the idea happens to strike the cultivator. The droppings are not collected and spread over the field like cattle dung, but allowed to remain on the ground for some days till they thoroughly decompose and rot, when they are ploughed in. Irrespective of individual prejudices, men of all castes, with the exception of the Brahmans, will allow their lands to be manured in this fashion. The fields which are generally thus manured are paddy, *harar* and *mandia* (*Eleusine corocana*), but all kinds of crops are benefited by it.

(4) *Droppings of sheep and goats.*—The droppings of these animals are collected by their owners and then spread on the fields in the same way as cowdung, but as the number kept by individual raiyats is very small, there is generally not enough of this manure to form a separate heap. It is therefore often mixed up with and thrown into the cowdung heap. Muhammadans keep these animals, and use their droppings for their own fields. Pans and other low castes similarly apply the manure to their fields too, and when they can collect enough they sometimes offer the manure for sale, although they get but a nominal price for the same. The use of the manure is not confined to any one particular crop. The practice of sheep folding is not carried out in the district.

(5) *Sweepings.*—The sweepings of the house, if separately collected instead of being thrown into the general dung heap, are only applied to low *sarad* lands, as they are said to induce the presence of white ants in soils growing other crops.

(6) *Old thatchings.*—These are also applied to low wet *sarad* lands, where they readily decompose.

(7) *Mud from old walls.*—When huts have been altogether deserted and are tumbling down, the mud from the walls containing an admixture of earth and the cowdung used for *lepoing*, is made use of as manure in growing vegetables.

Such mud has always to be supplemented with dung, as in itself it contains very little manurial value.

(8) *Pond mud* is often applied to low-lying paddy lands, as well as to *mandia*, but its use is not at all regular. It generally contains a large amount of vegetable matter, and so is generally dried before application.

(9) *Cake* is obtained principally from *castor* and *mustard* seed. After the expression of the oil, the refuse left in the mill is collected in the homestead, and when in sufficient quantity is preserved in pits until demanded by purchasers. Both mustard and castor cake are regarded as valuable manures, but their use is limited, as raiyats can only obtain them by purchase. They are for the most part used for such special crops as sugarcane, turmeric, *saru*, as well as for certain vegetables. The quantity, however, is invariably inadequate, as will be obvious from the quantity used for sugarcane cultivation, which rarely exceeds six maunds per standard acre. For the other crops the proportion is still less, and in some cases a mere sprinkling is given, hardly calculated to be productive of any good results.

Remarks and suggestions.—From the account which has preceded, it will be seen that cowdung, as in other parts of Bengal, is also in Cuttack the most important manure. Its manurial value, however, is much diminished by the negligent manner in which it is stored. A great deal of dung manure is also lost by its conversion into fuel cakes, where firewood is not available or where its high price renders its use prohibitive to the poor raiyat. What is needed therefore, in order to preserve dung for its proper use, is to put firewood within the reach of the ordinary cultivator. This can only be done by adopting a systematic plan of protecting the existing forests of the district, and by opening out ready communication with these forests, so that wood for fuel may be distributed all over the villages of the district at a reasonably low cost. Further remarks on this part of the subject will be found in the Chapter on the Fuel-supply of the district.

The manure-supply of the district may also be increased to some extent by the introduction of new manures, such as bonemeal. In Cuttack, however, such an innovation may present greater difficulties than in Bengal Proper. The isolation of the Uryas has made them thorough conservatives, and a novelty, especially where it touches their prejudices, can never be altogether acceptable. It may not be unknown that after the selection of a site for a building, the greatest care is taken to remove all bones that the land may here contain, for these, and especially the bones of the Chandalás, when left on the site, are particularly injurious to the felicity of the inmates, who are supposed to die without heirs. Hence it is, as Dr. Rajendra Lall Mitra has it in his book on the Antiquities of Orissa:—"If no bones are found, and still there should be any suspicion of the presence of any such offensive matter, a ceremony has to be performed, named *Sailyoddhára*, which is esteemed as highly effectual in neutralizing the evil effects of bones under a building." This same notion of evil effects prevails also in the presence of bones in a field. Several raiyats told me, should they happen to stumble against a bone in their fields, they would have to go through certain ablutions and ceremonies before they enter their huts. But these are prejudices after all, and though it may take a longer time to over-ride them here than elsewhere, it would not be surprising to find the raiyats of Cuttack follow the example of some of their more advanced brethren in Burdwan and other parts of Bengal, who have begun using bonemeal to a small extent. What is needed is tact and caution in introducing innovations; and when once the raiyats are awakened to the knowledge and appreciation of the manurial value of bonemeal and other artificial manures, they may eventually be glad to use them for increasing the outturn of their crops. A serious difficulty, however, presents itself in their acceptance of such an innovation in their want of capital. What artificial manures are likely to be most beneficial to the Cuttack soil, it is difficult to say without actual experiment. The use of bonemeal, super and saltpetre is being tried on a small scale in one or two Wards' and Government estates, but no conclusions can be drawn with regard to their manurial value until the experiments have been made for three or four years successively. The establishment of an experimental farm would prove useful in ascertaining the value of different kinds of manures for different kinds of soils and crops in the district.

SECTION 4.—*Irrigation.*

System of irrigation and crops that are generally irrigated.—Irrespective of the areas which are irrigated by canal water, a full account of which will be found in Appendix X, the lands of the Urya raiyats are also irrigated by river, tank and well water.

The following crops are irrigated:—

(1) *Paddy.*—As may be expected among all crops, the area irrigated of rice is the largest. The water is run into the fields. Many cultivators prefer pond water to canal water for paddy, when the latter is quite clear, as, being mixed with mud and simply run into the fields, without being poured over the plants, its constituents prove beneficial for the growth of the crop. For *sarad dhan*, water is taken from canals from Ashar to Kartik. The greatest run is made whenever the rains fail. When rain-water is very scarce in the month of Bhaddra, canal water, if close, is also taken for *biali dhan.* If not close enough, pond or other water is used. *Dalua* lands are generally irrigated in the cold weather in Magh.

(2) *Cotton.*—When the season is excessively dry, canal water is resorted to for cotton.

(3) *Sugarcane.*—Sugarcane lands are often selected near the banks of *jhils* and tanks, and are generally supplied with water lifted from the river or from pools and tanks. They very urgently require water in the hot weather, from Falgun to the beginning of Ashar.

(4) *Tobacco.*—The time for irrigating tobacco lands depends on the time when the crop is sown, extending generally throughout the cold weather.

(5) *Pán.*—This crop is grown on high raised lands, and has to be supplied with water raised by some apparatus. It is watered throughout the year with the exception of the rainy months.

(6) *Kulthi, harar and other pulses.*—These are seldom irrigated. Wheat is occasionally watered, but barley as a rule is not. Irrigation is resorted to for these two cereals when there is a scarcity of rainfall in the month of Pous.

(7) *Cheena.*—Water is very essential for this crop, and is taken from canals and other sources whenever there is a deficiency in the rainfall.

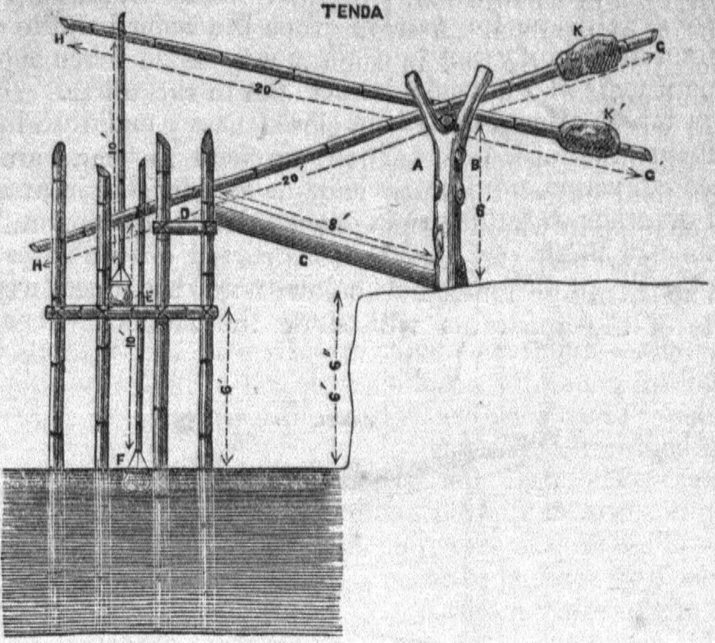
(8) *Indigo.*—Since indigo has begun to be cultivated in the district, every year it has been irrigated by canal water.

(9) *Turmeric.*—For this crop, water is required when the weather is very dry in the latter end of June or beginning of July.

(10) *Garden crops, such as chillies, brinjals, potatoes, onions, garlic, radishes, saru, and other vegetables.*—These require to be irrigated plentifully, and are generally watered by lifts. Well water is considered best for such crops.

Apparatus for raising water.—A great portion of the land of the raiyats is irrigated by mere gravitation, but where water has to be lifted, the following apparatus are used:—

The tenda.—This water-lift (also styled the *kumbhi*) is generally used when the height of the field is 6 feet or more above the level of the water, being capable of raising water from a depth of 15 feet. Close by the *bunds* of a river or by the edge of a tank or canal, four bamboo posts are set up at the four corners of a square, on the top of which a platform is made of four or six bamboos lashed together with ropes and cross-pieces of the same material strong enough to support the weight of a man and with sufficient room for him to stand upon. Resting on the platform is the *nodha*, made generally from the trunk of the palm tree, used for receiving and directing the water on to the fields. Two other posts, generally of wood, are then fixed on the *bund* or field to which it is desired to convey the water, and supported on them is placed a beam, which is securely tied to the posts with ropes. On this beam is fixed a fulcrum of wood, a cubit and-a-half in length and half a cubit in width, to which a bamboo pole 10 to 15 cubits in length is attached to act as a lever. The lower end of this pole or lever is weighted by tying to it thin bamboo branches well smeared with mud, or by hanging from it a stone of suitable size. To the upper end of the pole is fastened a thin bamboo about 6 to 10 cubits in length, which hangs perpendicularly, so that the lower end reaches the water below. To this lower end of the thin bamboo, which is used practically as a handle, an earthen pot (*handi*) capable of holding about 5 to 10 seers of water, is attached by means of ropes tied round the neck of the pot and suspended on to a hook at the end of the bamboo. This hook is nothing but a small peg of four or six fingers in length which is passed through a small hole bored into the lower end of the bamboo. This long thin bamboo is called the *hata-baunsa*. The subjoined diagram illustrates the different parts and working of the *tenda* :—

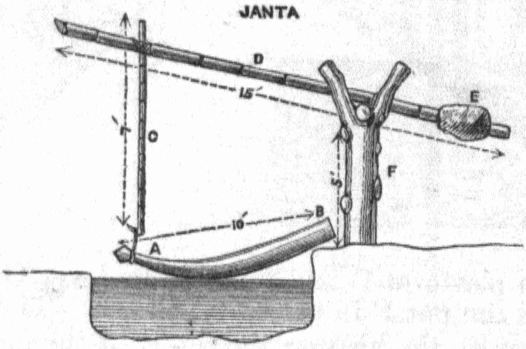

TENDA

A man stands on platform D and forcing the lever GH down by means of the *hata-baunsa* E, dips the pot F in the water below. The pot filled with water is then easily forced up by the heavier weight K at the end of the shorter arm of the lever, and it is emptied by the hand into the long trough C formed by scooping out one-half of a palm tree cut longitudinally, which connects the platform with the land. A main channel is cut from the end of this trough, or *nodha*, to the land which is to be irrigated, and the water is then conveyed by smaller channels all over the fields. The only other letters of the diagram now requiring explanation are A and B, which represent the posts supporting the fulcrum. The two positions of the lever show the lift at work and at rest. The measurements in the diagram are those of a particular lift seen at Banki. Where water is taken from a well, the two posts supporting the lever are fixed about five or seven cubits away from the well, and the whole arrangement and process for lifting water is the same except that the necessity of erecting a platform is obviated by the man standing on the masonry work of the well from where he pulls down the handle until the pot reaches the water level.

The seni.—The *seni* is made of thin pieces of bamboo wicker of the shape of a long basket (about 1½ cubits in length) open on the top lengthwise and closed at the bottom and back, with the edges bound with bamboo lathes. Water may be lifted with it to a height of about six feet. A pit about 3 cubits square is dug in shallow water close to the bank of a tank, canal or *jhil*, which forms the reservoir. When the water dries up from this pit, fresh supplies are bailed into it from the tank, canal or *jhil*, as the case may be. Two men take their stand on either side of the pit. The *seni* has four ropes tied to it, two on each side. Each man takes hold of the two ropes on his side, and in each hand; and both men together give the *seni* a backward swing, and dashing it forward dip it with force into the reservoir. The *seni* is then full of water, and the forward motion of the swing being continued, it is lifted out of the water and up, till it is brought to a level with the *bund*, where it is emptied into a narrow channel dug out and made ready to receive and convey the water to the field. The channel (*panisala*) slopes towards the field, so that the water runs down easily. It often happens that there are two or more fields to be watered by one *seni*, or it may be that the second field is situated on a higher level than the first. In such a case, or when the field is a long way off, the water is allowed to run down the channel until it reaches the foot of the rising ground on which the second field is situated or at a convenient distance, midway from the distant field, and is there allowed to accumulate in another pit forming a second reservoir, where another set of two men lift the water up to a channel in the higher field with a *seni* by a process similar to that described above. Similarly, the water may be lifted to a third or fourth stage when necessary.

The janta.—A piece of *gambhari* or *simli*, or any other light and hard wood 7 or 8 cubits in length and $\frac{3}{4}$ths of a cubit wide at one end, gradually tapering to half a cubit at the other, is dug out so as to represent a miniature *dingy* or canoe, which is closed at the broad end and open at the narrow end. On the bank of a *jhil* or small canal, two small posts are set up connected on the top by a beam of bamboo. A strong rope is attached to the middle of this beam, to which the *janta* is tied in such a way as to leave the open narrow end on dry land and dip the broad closed end in the water. One man stands at this end and with his foot forces the closed heavy end into the water till it is submerged and filled, when it is lifted up with the hand and the contents emptied in the field out of the open end, or if the field is at some distance, into a narrow channel in which it runs down to the field.

Sometimes, however, the *janta* is constructed on the lever principle like the *tenda*. The diagram appended below with the measurements of the different parts of the apparatus will show the similarity between the two lifts:—



AB is a triangular canoe-shaped vessel made of mango, *gambhari* or other light wood. Its thick end B rests on the channel leading to the field, while the thin end A is fastened to a hook at the bottom of the perpendicular handle of bamboo C, which in its turn is attached to the lever. A pillar F of wood supports the lever, so that the longer arm is connected with the handle, while the shorter one is weighted as in the *tenda*. One man is able to work this apparatus. As he pulls down the handle the thin end of the *janta* dips into the water and is then raised by the weight E called the *balna*, when the water passes into the channel. Like the *seni*, it is used for lifting water to a height of some six feet.

The bhara.—A *mathia* (earthen water-pot) or *ghurra* (brass water-pot) or a *handi* is dipped with the hand in the river, tank, canal, *jhil*, *brada* (a natural reservoir or lake) or *kupa* (well) and filled with water. Two such pots having been filled, they are then placed on a rude network (*siká*) of ropes attached to both ends of a piece of strong bamboo or *bángy*, and carried on the shoulders of one man. In this way men carry water to long distances either for drinking or to irrigate fields planted with vegetables or tobacco, &c. This plan of watering is very extensively followed.

Cost of working.—The cost of working varies a great deal according to the distance of the field from the source of irrigation, the height to which the water is to be lifted, the condition of the land, *i.e.*, whether ploughed or not, and the kind of crop to be irrigated. When the crop is sugarcane for which irrigation is so important, the following would be the cost per acre, of land for the first irrigation for each of the kinds of machines above mentioned:—

(*a*) *The tenda.*—Sixteen men would irrigate one acre of land in a day, which at the average rate of 2 annas per acre would amount to Rs. 2.

(*b*) *The janta.*—Eight men would irrigate one acre per day, the cost of which at the above rate would amount to Re. 1.

(*c*) *The seni.*—Twelve men would finish an acre in one day, and the cost at 2 annas per head would be Rs. 1-8.

(*d*) *The bhara.*—Twenty to 24 men would be required to irrigate a full acre of land, the cost of which would vary at the above rate from Rs. 2-8 to Rs. 3.

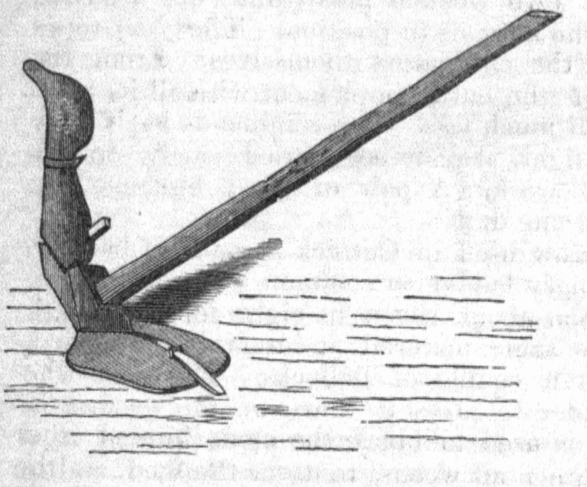
The field to be irrigated is supposed to be near the source of water, and the depth of water such that it can be taken to the field in one stage. The cost would proportionately increase with further stages.

For the results obtained by irrigation, and for the different kinds of crops irrigated by canal water, (*vide* Appendix X).

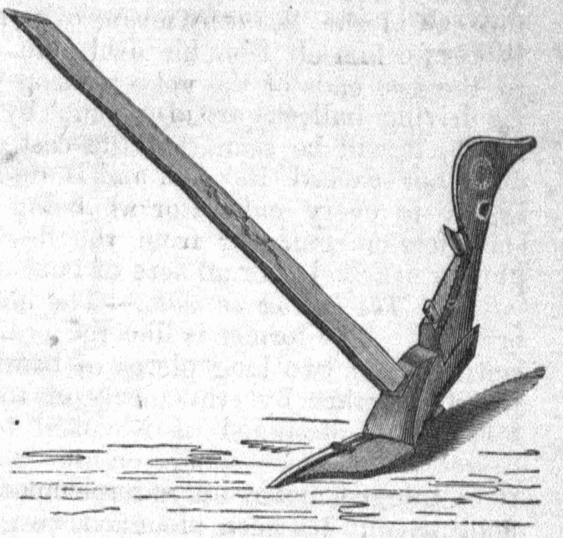
SECTION 5.—*Agricultural implements.*

The implements commonly used in the district by the agricultural classes are as follow:—

I.—Implements used in preparing the land for cultivation and in weeding and harvesting.—(1) *The plough or nangal.*—Two different sizes of ploughs are used in agricultural operations, known respectively as the *bara nangal* (large plough) and the *chota nangal* (small plough). *Vide* diagrams below:—



BARA NANGAL



CHOTA NANGAL

They are not, however, two different forms of ploughs. The circular shaped body of the large plough by constant use gradually wears out and gets elongated in shape and of a smaller size, when it goes under the name of the small plough. In some parts of the district, several degrees of wear and tear are recognized in these ploughs, and different names accordingly given to them. The new plough known as the *bara nangal* is generally made in the month of Falgun, and is used for breaking the land. In three or four months the body (*nangal*) wears out on both sides, so that the plough assumes a long shape and is then styled the *bara goji*. The share also wears out similarly. Such a plough is used for preparing *rabi lands*, and for reploughing *biali* and *sarad* paddy-fields. On being used for a further period, the plough wears out still more, and is then known as the *chota goji*, being at this stage used principally for low wet *dalua* paddy lands. The body or *nangalmunda* is made of different kinds of wood, *e.g.*, mango wood, and scarcely costs more than 8 annas. It is bent at the base at an angle, so that one portion lies flat, while the other stretches upwards and is joined to the handle. The flat portion which rests on the ground, as has been already described, is rounded in the form of a cone. When new, it is 12 to 15 inches in length and about 10 to 13 inches in breadth across the centre, and when used for some time, the measurements change according to the wear and tear the implement has had. Lengthwise in the upper side of the body a groove is cut for holding the share (*nangal nuha*), which is fixed in its position by small iron hoops (*dahar* or *jugulikanta*) through which it passes. The share is made of iron, costing about 4 to 6 annas. Its length varies from 10 to 15 inches, and it weighs about ¾ths of a seer. It differs from the ordinary Bengal ploughshare in that in protruding out of the body it does not gradually come to a point. The protruding portion is of the same width throughout, and does not gradually adapt itself to the shape of the body, as it is generally longer and bulges out of the body. The result is that it does not go as deep into the soil, and does not break up the land as readily. The body of the plough does not help the ploughshare to force its way into the ground in a muddy soil, where the straight narrow share, about an inch in breadth, only makes a rut, while the body of the plough sweeps along the ground to very little purpose. In a loose sandy soil its work is more effective. With the body, the share also wears out, and as a rule a new share is not exchanged for the old one. The upper end of the body is in the form of a pyramid. It is joined by means of a small wooden or bamboo peg (*kantikila*) to a handle about a cubit or a cubit and-a-half in length made of *asan*, *sissu* or some other wood called the *kanti*, the price of which does not exceed 2 annas. This handle is not fixed perpendicularly, but inclines at a small angle towards the ploughman when he works the plough. Fixed by means of a bamboo or wooden peg, called the *pitchikila*, through the back end of the breast of the body at an acute angle, is the beam or *isa*, of a length varying from six to eight feet, which, like the handle, is made of *sissu* or tamarind wood costing about 2 annas. The only remaining portion of the plough is the *juali* (cost 3 annas), which is exactly the same as in other parts of Bengal, being about three or three-and-a-half cubits long. It is attached to the top end of the beam by means of a rope (*anda*) which the raiyat generally makes for himself from his own jute. Two wooden pins (*saila*) are attached to the two ends of the yoke to keep the animals in position. The (*jote*) ropes for driving bullocks are also made by the cultivators themselves. From the above, it will be seen that the cost of the entire implement with all its parts does not exceed Rs. 1·8, and is often much less. It recommends itself very highly to every cultivator as, being light, it can be carried easily on the shoulders on returning from the day's work. A pair of good bullocks can plough nearly ⅓rd of an acre of land in one day

(2) *The harrow or mahi.*—The harrow used in Cuttack is made of bamboo or wood. The former is like the ordinary ladder so common all over Bengal, consisting of two long pieces of bamboo about seven to eight feet in length joined together by cross-pieces of the same material at intervals of about a foot. Thus designed, it is yoked to a couple of bullocks. The man who drives the animals stands on the ladder to press it down on the ground as it is dragged along. The implement is used to break the clods formed in a field after it has been ploughed, to gather all weeds, to cover the seed, and to act as a roller to make the soil thoroughly level. When made of wood, it is much more substantial, and consequently readily breaks all clods and pulverizes the soil more effectually. In this respect it has an advantage over the longer bamboo harrow described above. The latter on account of its lightness is generally found to curve a bit in the centre, so that there is often a danger of snapping, and a tendency also to glide over clods and leave them unbroken. The two long parallel beams are called *pallahs*, and the cross bars passing them together are known as *kayahs*. *Sál* wood is generally used for the construction of the implement when made of wood. If of bamboo, the cost is nominal. A wooden harrow, on the other hand, cannot be got for less than 8 or 12 annas. During the course of an hour ⅓rd of an acre of land can be harrowed by a pair of bullocks.

(3) *The rake or bida.*—The rake consists of a flat piece of wood, generally *sál*, about three to three-and-a-half cubits in length called the *thura*, with 12 to 16 iron tines or *kantas* attached to it, each about 14 inches in length. These teeth pass through holes or *kanas* bored in the plank, where they are fixed or tightened by small wedge-shaped pieces of wood known as *khilas*. In the centre of the plank is attached a beam or *isa*, which in its turn is tied to the yoke. The *bida* is very useful in loosening the soil and raking up weeds. The cost of the implement varies from Rs. 4 to Rs. 7.

(4) *The spade.*—The large mattock or spade used for digging is called the *kodali*, and a small one used for a similar purpose, and especially for hoeing in narrow lines, is called the *kuri*. The price of one of these implements varies from 10 to 12 annas. A mattock of a different shape is used to break the land before digging it with the spade. It has a narrower blade and weighs ½ seer less than the ordinary spade. The cost of this implement, called the *kankh*, is about 8 annas. The wooden handle to which the hoe is attached is called in Urya *bettá*, and the ring or socket in the blade to which the handle is fixed is the *pasa*. The *kodali* in use in Cuttack is lighter than that in general use

round about Calcutta. The blade is so fixed to the handle that in working with it, the stroke instead of going perpendicularly into the soil, runs almost parallel to the surface, so that a very small depth of the soil is stirred. Besides hoeing, the spade is used for almost all kinds of earthwork.

(5) *The hand-hoe or khurpi.*—This is a small instrument which is sometimes used for weeding, but generally for scraping grass. It has a curved or straight blade which is attached to a wooden handle, and costs about 2 annas. Weeding, however, is very seldom done with this or any other iron implement. In some parts of the district even an ordinary piece of bamboo is not used for this purpose as is done in some parts of Bengal, the raiyats being quite content to work with a twig plucked off a jungly shrub.

(6) *The sickle or dao.*—The sickle used for cutting grass and reaping crops is generally toothed. It is made of iron, with a wooden handle. The price of the implement is about 1 anna or 6 pice. The point of the blade is the *muna*, the toothed edge the *dara*, and the back of the blade the *piti*. Besides serving as a reaping hook, the *dao* is used for weeding and for loosening the earth round young plants. Toddy sellers use a small sickle without teeth for tapping palm trees.

(7) *The clod-crusher or pitana.*—This is simply a wooden hammer (*sál* wood) with a small handle, which is used to break up all large clods that have not been pulverized with the ladder. It costs little or nothing, as the village carpenter who makes the plough also makes the mallet for the cultivators, who, however, supplies his own wood. The price of the wood, if purchased, would be 1 or 2 pice.

(8) *The crowbar.*—Two kinds of crowbars are used in the district. The poorer cultivators, who cannot afford a crowbar made wholly of iron, called the *sabala*, do their work with the *kanthi*, which consists of a blade of iron about 8 inches in length, attached to the end of a bamboo or wooden handle about 2 to 2½ cubits long. The part of the blade (a length of two inches) which is fixed into the handle is called the *baranga*, and the portion which protrudes is the *kanthi*. The socket for holding the handle is the *sama*. The price of this implement varies from 2 to 3 annas, while an iron crowbar costs about 12 annas.

(9) *The hatchet.*—The shape of the hatchet or *katari*, as it is called in Cuttack, varies slightly from that usually seen in other parts of Bengal, the iron blade generally being shorter and less curved and the wooden handle longer. The price is about 5 annas.

II.—Implements used in sowing and irrigation, winnowing, &c.—(1) *Baskets.*—The basket used specially by the sower is called the *tokoi*. It is made of cane (*bét*) or of the twigs of bamboo (*kainchi*) woven together. The winnowing basket or sieve is called the *chaluni*, and that used for sifting grains of various sizes is called the *hápan* or *koola*. It is made of bamboo slips woven together, and is generally of an oblong shape, with a small projection on three sides. A small basket made of straw and used for storing grain is known as the *pachia*. Baskets worn over the head by the cultivators during the hot and rainy weather have different names, such as the *pakia*, which goes over the head and down the back, and the *takar*, which protects the head alone. Baskets used in irrigating fields, as well as the other implements used in connection with irrigation, have been already described in the Chapter on "*Irrigation.*"

III.—Implements and appliances used in connection with cattle.—(1) *The fodder cutter.*—Two or three implements are used for cutting fodder, such as the *jhabai*, the *kachia*, the *punki*, and *dao*, but the last of these is the fodder cutter proper, consisting of an iron blade or *phali* attached to a handle of wood.

(2) *The feeding trough.*—This has no particular name, nor is it confined to any particular material. Any vessel that is available is converted into a trough for cattle.

(3) *The muzzle.*—The muzzle which is put on cattle when treading corn and at other times is a netted bag made of string. The muzzle put on the mouth of a calf to prevent it sucking its mother is also made of string, and is known as the *muhunali*.

(4) *Ropes.*—The rope used for tethering cattle is the *paga*, and the head rope passing through the nose of the animals is the *tundi*. These are all made as a rule by the cultivators themselves.

IV.—Dairy utensils.—The names of the various vessels used in dairying will be found in the Section on Dairying.

V.—Appliances used in the manufacture of gur, oil, and ghi.—These have been described elsewhere in the report.

VI.—Appliances used in the conveyance of grain.—Baskets of different kinds are used for carying grain. A small straw grain basket is called the *pachia*, and a larger open basket made of rattan or bamboo is known as the *betha*. A lid is sometimes used to cover these baskets, known commonly as the *dala* or *orona*. An ordinary rice sack is called the *akha*, and a large grain sack carried on the back of a bullock the *basta akha*. When carts are used for carrying grain, a long basket exactly fitting the cart is placed on it, made of split bamboo. It is styled the *odoro*, being generally used for carrying grain from the field to the homestead. The cost of such a basket does not exceed 5 annas. Besides the above modes of conveyance, grain is also carried in boats, being loaded into bags or boats.

VII.—Appliances used in storing grain.—These have been described in a subsequent page of this report.

VIII.—Appliances used in husking grain.—(1) *The pedal for husking grain.*—This apparatus consists of a moveable beam called the *dhenki*, from which the whole implement takes its name, working on an axle or *pakhi*, which is supported on two wooden pillars known locally as *kunthas*. The portion of the beam beyond the axle is longer than that which is used as the pedal, where the worker rests his foot. At the end of the longer portion is a thick peg or *pahar* bound at the top by an iron ferrule or *sama*, and as it is worked up and down it crushes the rice which is placed between it and the mortar. The portion of the beam on which the foot rests is the *nagi*. The mortar or *bharandi* consists of a stone placed at the bottom of a hole dug in the ground, and on it the peg presses. The workman or woman grasps a hand rail either of wood or string called the *chitkuni*, and works the pedal with the foot, while at the same time another person is employed in feeding the mortar and stirring the grain within it with his hand. The cost of the entire implement is about Re. 1.

(2) *The pestle and mortar used for husking grain.*—The mortar is called the *kundhi*, and is generally made of *sál* wood; and the pestle used to crush the grain is known as the *pahurani*. The price of these varies from 8 to 12 annas. This implement is not very common among the Uryas, being chiefly used by the Telugus who have settled down in the district.

(3) *The hand-grinding mill.*—This is known as the *janta* or *chaki*, and is worked by two women, either standing or sitting. The smaller ones are generally used for breaking pulses, and are worked by one person. The apparatus consists of two stones made of *balmala*, a granitic stone resembling sandstone in appearance, placed one above the other, which work round a perpendicular axle called the *manikhuti*. The channel by which the machine is fed is called the *gartha*. The amount of grain crushed in an hour by two women is 8 Cuttack seers. The price of the implement varies from 8 annas to Rs. 2.

Suggestions for improvement.—The first idea that suggests itself to my mind regarding the improvement of implements used by the raiyats of Cuttack is the introduction of the Bihia roller mills and evaporating pans made by Thomson and Mylne. An account of the ordinary local sugarcane mill is not given in this chapter, as it will be described when treating of the cultivation of the cane and the manufacture of *gur*. To give the subject prominence, however, I recommend in this chapter the substitution of Thomson and Mylne's machines for those now generally used by the raiyats. Those introduced by me in the Madhupur estate have proved very useful and are appreciated by the raiyats, many of whom have combined together to buy one or two of them.

With regard to the plough, I am of opinion that a great improvement would be effected if the share now in use were replaced by one of the pattern used in Burdwan, where the back of the share is broader than the front portion, which first enters the soil. Such a share being of the same shape as the flat portion of the body of the plough, is helped by it to go deep into the soil. It is therefore calculated to break up a muddy soil much more readily than the straight narrow share now in use. The Sibpur plough, if adopted by the raiyats, would be a great acquisition for upland hard soils. It would be useful for winter sowings and for breaking up the land, doing the work more thoroughly, inasmuch as it would invert the soil and expose it to the influence of the sun and atmosphere, and much more quickly, one ploughing with this plough being equivalent to three or four ploughings with the Urya plough.

This is not a mere surmise, as the fact has been admitted by the raiyats themselves in the ploughing competitions that I have started in their presence. They object to the plough, however, on the score of expense, and consider it altogether too heavy for their bullocks and too much for themselves to carry on their shoulders to and from their fields.

The ordinary spade of Cuttack may also be improved by fixing the blade to the handle in such a way that when worked it would go more perpendicularly into the soil. At present the stroke runs almost parallel to the surface, the result of which is that a very small depth of the soil is stirred. The other implements used by the raiyats are, I think, well adapted to their requirements.

SECTION 6.—*Crops grown.*

The following table gives the vernacular, ordinary and scientific names of the different kinds of crops grown in Cuttack:—

Number.	Kind of crop.	Urya name.	Ordinary name.	Botanical name.	Botanical order.
1	Cereal	Sarad dhan	Lowland paddy	Oryza Sativa	Gramineœ.
2	Do.	Biali dhan	Upland paddy	Ditto	Do.
3	Do.	Dalua dhan	Boro paddy	Ditto	Do.
4	Do.	Mandia	Marua	Eleusine coracana	Do.
5	Do.	Cheena	Cheena	Panicum miliaceum	Do.
6	Do.	Suan	Sawan	Panicum frumentaceum	Do.
7	Do.	Kangu	Kaon	Panicum italicum	Do.
8	Do.	Makka	Maize	Zea Mays	Do.
9	Do.	Gahama	Wheat	Triticum sativum	Do.
10	Do.	Jaba	Barley	Hordeum vulgare	Do.
11	Pulse	Muga	Mung	Phaseolus mungo	Leguminosœ.
12	Do.	Birhi	Birhikalai	Phaseolus radiatus	Do.
13	Do.	Kulthi	Kurthi	Dolichos biflorus	Do.
14	Do.	Chana	Khesari	Lathyrus sativus	Do.
15	Do.	Barguri	Cow gram	Vigna catjang	Do.
16	Do.	Harar	Arhar	Cajanus indicus	Do.
17	Do.	Masuri	Masur	Ervum lens	Do.
18	Do.	But	Gram	Cicer arietenum	Do.
19	Do.	Matar	Peas	Pisum arvense	Do.
20	Fibre	Nalita	Jute	Corchorus capsularis	Tilliaceœ.
21	Do.	Chanpat	Sunn	Crotoloria juncea	Leguminosœ.
22	Do.	Kapa	Cotton	Gossypium herbaceum	Malvaceœ.
23	Do.	Dhaindicha	Dhaincha	Sesbania aculeata	Leguminosœ.
24	Oil-seed	Gaba, Jara	Castor	Ricinus communis	Euphorbiaceœ.
25	Do.	Pisi, Tisi	Linseed	Linum usitatissimum	Lineœ.
26	Do.	Khasa, Rasi	Til	Sesamum orientale	Sesameœ.
27	Do.	Sarisha	Mustard	Brassica campestris	Cruciferœ.
28	Miscellaneous crop	Akhu	Sugarcane	Saccharatum officinarum	Gramineœ.
29	Do.	Pana	Betel	Piper betel	Piperaceœ.
30	Do.	Tamáku	Tobacco	Solanum nicotianum	Solaneœ.
31	Do.	Haldi	Turmeric	Curcuma longa	Zingiberaceœ.
32	Do.	Ada	Ginger	Zingiber officinale	Do.
33	Do.	Arrarut	Arrowroot	Maranta arundinacea	Marantaceœ.
34	Do.	Dhaniya	Coriander seed	Coriandrum sativum	Umbelliferœ.
35	Do.	Methi	Fenugreek	Trigonella fœnum	Leguminosœ.
36	Do.	Panmahuri	Aniseed	Pimpinella anisum	Umbelliferœ.
37	Do.	Jira	Cumin seed	Cuminum cyminum	Do.
38	Do.	Nila	Indigo	Indigofera tinctorea	Leguminosœ.
39	Do.	Kusuma	Safflower	Carthamus tinctorius	Compositœ.
40	Do.	Kurbuli	......	......	......
41	Garden crop	Baigana	Brinjals	Solanum melongena	Solaneœ.
42	Do.	Bilati alu	Potatoes	Solanum tuberosum	Do.
43	Do.	Lanka	Chillies	Capsicum frutescens	Do.
44	Do.	Piaj	Onions	Allium ascalonicum	Liliaceœ.
45	Do.	Lasun, Rasuna	Garlic	Allium sativum	Do.
46	Do.	Kandamul	Sweet potatoes	Batatus edulis	Convolvulaceœ.
47	Do.	Saru	Arum	Colocasia antiquorum	Aroideœ.
48	Do.	Khamba alu	Yam	Dioscorea sativa	Dioscoreœ.
49	Do.	Mula	Radishes	Raphanus sativus	Cruciferœ.
50	Do.	Kakuri	Cucumber	Cucumis sativus	Cucurbitaceœ.
51	Do.	Lau	Bottle gourd	Lagenaria vulgaris	Do.
52	Do.	Phuti	Mash melon	Cucumis momordica	Do.
53	Do.	Tarbhuj	Water melon	Citrullus vulgaris	Do.
54	Do.	Chalana	Chalanas	Citrullus species	Do.
55	Do.	Baitalu, Baitakakharu.	Pumpkin	Cucurbita maxima	Do.
56	Do.	Patal	Palbal	Trichosanthes dioica	Do.
57	Do.	Janhi	Tarai	Luffa acutangula	Do.
58	Do.	Kalara	Karela	Momordica charantia	Do.
59	Do.	Uccha	Ucche	Momordica muricata	Do.
60	Do.	Bhendi	Dhenras	Hibiscus esculentus	Malvaceœ.
61	Do.	Sima	Indian bean	Dolichos lablab	Leguminosœ.
62	Do.	Kadali	Plantain	Musa paradiasica	Musaceœ.

Of the above, rice is the principal crop of the district. *Muga*, *harar*, *birhi*, *kulthi*, and *jara* are also largely grown. Wherever irrigation is convenient, sugarcane and cotton are cultivated. Tobacco, though not occupying a large area of land, is to be found all over the district, by the banks of rivers, and on homestead lands. *Pán* is confined only to certain localities. *Mandia* is also a pretty common crop. *Suan*, *cheena* and *kungu* are mostly confined to the western hilly parts of the district. Jute is not grown to any very large extent, although there is suitable land for its cultivation in various parts of the district. It is generally cultivated only for individual use in small patches of homestead lands Barley and wheat are rather rare, and do not seem to grow well. Of vegetables, the chief crop is *brinjal*. There is scarcely a village where *brinjal* cannot be had. The quality, however, is as a rule very inferior. *Saru* occupies an important place in kitchen gardening, being grown to a very large extent by certain classes of Brahmans, who take their name from this tuber. Sweet potatoes and yams of different kinds are grown largely on *toila* lands. Pumpkins and gourds of different kinds are raised on a mixture of sand and silt deposited by rivers. Other vegetables, such as beans, peas, greens of different varieties, radishes, onions and garlic, are grown generally on *bari* or homestead lands.

SECTION 7.—*Rotation.*

There is no such thing as a scientific rotation of crops in the Cuttack district,—at least it is not adopted as a principle of cultivation. In practice, however, it is to be observed that rotation is followed to a certain extent in the case of the more exhausting crops. Sugarcane, for instance, is not grown year after year on the same land. When cultivated on *sarad* paddy lands, the crop is taken only once in four years on the same land, alternating with paddy or following a fallow. Such is the case with *ekfasal* lands, *i.e.*, cultivated with one crop a year. But the nature of the land all over in different parts of the district is such that, coupled with a favourable periodicity of the seasons, two harvests are very widely taken. As in other parts of Bengal, these are the lands on which is grown early autumn rice. On such lands the crop is usually harvested in the month of Bhaddra, when the land is prepared for the usual *rabi* crops, including the different pulses, such as *muga*, *harar*, *kulthi*, *birhi*, &c. Wheat and barley also follow autumn paddy, but their cultivation is very limited. The practice is not uncommon on such *dofasal* lands (twice cropped) to grow *birhi* after the early paddy (autumn) crop, and then when the former has been harvested in the month of Magh, to prepare the land for sugarcane. It must be noticed here, that some of this *dofasal* cropping of the raiyat, though unknown to him, is one of the principles of rotation, where a leguminous crop is made to intervene between two cereals. It is the practice with a few raiyats, as is the case in the Lohardaga district, to alternate broadcasted paddy with transplanted paddy, their real object being, as has been pointed out in the report of the agriculture on Lohardaga, to economize manure, which is applied only to broadcasted paddy in such instances, very little or no manure being given to transplanted paddy taken from the land in the following year.

SECTION 8.—*Cultivation of crops.*

Cereals.

Dhan (*Paddy—Oryza sativa*).

Importance.—The staple crop of the district is rice, on the success or failure of which depends all the material prosperity or otherwise of the Urya. The holding of every peasant has a certain area devoted to its cultivation, and in fact in many parts it is the one crop grown.

Varieties.—The numerous varieties of paddy may be divided into three principal classes, viz:—

(1) Biali or autumn rice—
    (1) Satika.
    (2) Bara.

(2) Sarad or winter rice—
    (1) Guru.
    (2) Laghu.

(3) Dalua.

Biali dhan, i.e., the *aus dhan* of Bengal, consisting both of fine and coarse specimens of rice, is the earliest variety. It is grown on the high lands of the district, being sown in April or May and reaped by the end of August or the beginning of September.

Sarad dhan, i.e., the *amam dhan* of Bengal, may also be coarse or fine. It is cultivated on all the low lands of the district, which grow different varieties according to the different levels in which they themselves are situated. It is sown in May or June, the harvesting season extending, according to the kind of seed sown, from October and November to December and January.

Dalua, i.e., the *boro dhan* of Bengal, is found generally along the low-lying banks of rivers, or in marshy lands, being sown in January or February and cut in March, April, or May.

The following are the local names of some of the principal varieties of each of the above classes:—

1. *Biali*—(*a*) Bara:—Bakiri, ikiri, raisiri, harusatia, madia, chowali, anothorka, jaithakuri, girisari.
   (*b*) Satika:—Harva.
2. *Sarad*—(*a*) Laghu:—Champa, bara champa, kantakuli, biriajan, palashphul, barapunka, dhakiasari, nudia, kantanudia, mutara, sonakhil, nariaphul, madhumatali, kolakaranje, balarami, kantapatia, brahmanbai, korajira, machkanta, dewanbhog, bhalunki, narasingnangura, lajookbadan, doodshar.
   (*b*) Guru:—Nemai, champaisali, baliri, khura, tulsiphul, maghudhi, rabana, harisankar.
3. *Dalua.*—Kakuria, karainkiri.

1.—*Upland paddy* (*Biali dhan*).

The upland or *aus* paddy of the district may be subdivided into two main classes, viz., the early variety or *satika*, so called from its coming to maturity within 60 days from the date of sowing, and the *bara dhan*, which supplies the raiyat with a food-grain only second in importance to lowland paddy. A failure in this crop does not very sensibly affect the people, as the loss is to a certain extent recouped by a good harvest of *sarad*, which is made to do service in such a case; when, for example, the *biali* crop fails on the lower *biali* lands from the effects of a flood, and there is no time for resowing, or when there is an insufficiency of seed, the land is sown with *sarad dhan*, which with a seasonable rainfall gives a very fair harvest, and so makes up for the loss occasioned by the failure of the autumn variety.

Soil.—The soil on which the crop is grown may be divided into three classes, viz.,—

(*a*) Clayey lands containing a mixture of carbonate of lime.
(*b*) Loamy or dorosha lands, *i.e.*, a mixture of sand and clay.
(*c*) Alluvial lands formed by the silt deposited by floods.

The outturn obtained from the first of these is not as good as that obtained from loamy or alluvial lands, as the crop requires a light loose soil.

Rotation.—*Rabi* crops, such as *muga*, *birhi*, and *kulthi*, are regularly taken after the harvesting of the *biali* paddy crop.

Cultivation.—When grown on alluvial soil, the land is ploughed immediately after the harvesting of the *rabi* crop, so that it may be ready to be sown early, a late crop being always under the danger of being destroyed by the rise of the rivers. When grown on very high lands, advantage is taken of the first showers to plough and harrow the land thoroughly five or six times in the month of Falgun. Nothing more is done till in the month of Jaishti, manure consisting of cowdung, rotten straw, ashes, &c., is laid in heaps all over the field at intervals of 15 feet, and subsequently scattered all over with the spade. With the first shower after this, seed is broadcasted at the rate of about 40 seers per acre. On the third day after sowing, the plough and harrow are driven over the land to facilitate, as the cultivators say, the sprouting of the seed. The germination generally takes place on the fifth day after the sowing. Fifteen days after this, when the plants are about six inches in height, the field is harrowed with the ordinary ladder or *mahi*, as well as with the rake or *bida*, the object of the latter operation being to thin out the crop and so lessen the strain on the productive power of the land. During this operation, the weather is required to be dry. There is an Uriya saying which runs thus:—

"Biali, tathita, thuichu kanhi,"

i.e., "if the sun shines on the *biali* crop, when the *bida* is passed over it, where will you store it?"

Many of the plants which are thus rooted out by the tines of the rake, and which for a time look dry and withering, eventually throw out new rootlets and flourish very well. The next operation, viz., that of weeding, commences 15 or 20 days after the harrowing. This is done by the hand, the three weedings that are given being respectively called *ora bachla* (first weeding), *dora bachla* (second weeding), and *tinore bachla* (third weeding). Nothing further is done till the crop is ready for harvesting in the month of Bhaddra. It is curious to observe that Friday is regarded by many cultivators as a very auspicious day to begin harvesting the paddy.

2.—*Lowland paddy* (*Sarad dhan*).

Extent of cultivation.—The approximate normal area under *sarad* or winter rice as returned for the final forecast of the winter rice crop in 1891, is stated by the Collector to be 1,576 square miles, which is about 80 per cent. of the total area estimated to be under cultivation.

Sub-varieties.—There are two kinds of *sarad dhan* grown in the district, viz., *guru* and *laghu*, which according to the method of sowing are also subdivided into the *bua* and *rua* varieties, the former of which are broadcasted and the latter transplanted.

(*a*) *Broadcasted rice or bua dhan.*

(*i*) *Guru.*

Soil.—The land in which this variety is grown is much lower than that used for the cultivation of the *laghu* varieties. It is locally known as *pat jami*, and is capable of retaining 4 to 5 feet of water, being rather clayey in its composition.

Cultivation and manuring.—After the harvesting of this variety in the month of Magh, the land is allowed to lie untouched till the end of Falgun or the beginning of Chaitra, when the cultivators commence looking out for the first showers of rain. Advantage is taken of them to give the land its first ploughings, an operation known locally as *karan*. It is then left exposed to the sun and to the action of the atmosphere.

At this time manure, consisting of cowdung and house refuse, is brought by the cultivators from their homestead, and laid in small heaps all over the field. No reckoning whatever is made of the quantity which is to be applied, depending as it does altogether on the stock which the raiyat has in store. In many instances no manure whatever is used, and especially is this the case in very low lands, or in those which have received a deposit of silt from river floods. As soon as rain begins to fall in the months of Baisakh and Jaishti, the manure heaps are scattered throughout the field with a *kodali* and well mixed with the soil by two or three ploughings and harrowings, and the land is then ready for sowing. Ploughing and sowing the lands when in this moist condition is known as *baturi buna*. Sometimes, when these first showers are late, the land after being well ploughed and harrowed, so that all large clods are thoroughly broken, is sown with seed in the month of Jaishti, and this method of sowing the lands while in a dry condition is called *kharudi buna*. When the latter method is followed, by which the raiyats say a better outturn is reaped, immediately after the sowing, one ploughing is given to the land with the object of burying in the seed deep. This is called *kharari buna*, and is considered very essential to prevent the seed from drying up. The ploughing is followed by a harrowing, and nothing more is now done, the plants beginning to appear above ground as soon as the first showers fall. When sown in the moist condition, very often the *kharari buna* is dispensed with, and a simple harrowing is given instead to cover the seed.

The quantity of seed sown (*i.e.*, the *bihan*) is on the average 40 Balasore seers per acre of land.

After treatment.—After the sowing, the treatment that occupies the attention of the cultivator is the regulation of water, and this is carried out by a system of small walls or embankments which are raised to surround the field. When once raised, they serve for several years, though they have to be repaired annually. By these embankments, or as they are called in Cuttack *auls*, water is accumulated in or let out of the field according to the requirement of the crop. When rain water is not sufficient, artificial irrigation is resorted to. If, on the other hand, there is sufficient rain, the plants spring up and grow rapidly. When the plants attain a height of one foot or one foot and-a-half, the land is given a weeding to remove grass and other jungly herbs. During the latter part of Kartik and the beginning of Aghran, the ears of corn begin to make their appearance, and gradually developing throughout the month, they approach maturity in the month of Pous, when they are ready for the sickle. The harvesting period commences now and extends throughout the month, and even into Magh. The yield of this crop is said to be the same as that of the *laghu* variety.

(*ii*) *Laghu.*

Soil.—The land for *laghu* paddy, although included in the low lands of the district, is situated at a higher level than that used for the cultivation of the *guru* varieties. It is called *kanda jami*, and is generally found accumulating 6 to 10 inches of water. It has a great advantage over *guru*, in that, being an early variety of winter rice, advantage is taken of the early harvesting to get in a crop of *muga.*

Cultivation.—The rice crop being harvested in Kartik, the land is ploughed in the month of Aghran four or five times according to the nature of the soil, and then levelled with the ladder or *mahi.* *Muga* is sown in the following month and harvested in Chaitra. The land is then allowed to remain fallow till Baisakh or Jaishti, advantage being taken of all showers to plough it thoroughly. Manure is applied in the same way as with *guru*, and *bihan* or seed broadcasted in Jaishti at the rate of about 40 to 45 Balasore seers per acre of land. Within fifteen days the seed germinates, and sends up little sprouts called *gajas.* If there is sufficient rain now, in another 15 or 20 days the plants are about a foot in height, and within the embankments there are about six inches of water. The land is now ploughed and harrowed two or three times. The first ploughing is called the *behurda*, and the second, which follows about a week after, is called *juár.* During this process many plants are rooted out and float about in the water. These are collected and then replaced by being thrust into the soil by the hand. The land is thus properly thinned and all gaps filled in, so that the field now assumes an even appearance, and the plants are enabled to tiller freely. Fifteen or twenty days after this operation called *khetua*, by which time the new plants have thoroughly established themselves, the field is given another harrowing called *kalamahi.* As fresh shoots now make their appearance greater necessity is felt for water, and the land is thoroughly weeded with the hand to enable these young shoots or *kenna* to develop freely. This weeding generally commences in the month of Bhaddra. The ears, called *linga basila*, make their appearance in the following month, *i.e.*, in Aswin. It is about this month that *milk* begins to form in the grain. The Uryas say—

> " Agā boono, pacha boono,
> Garbhana ku toon toono,"

i.e., "whether you sow early or late, at Garbana Sankranti (Aswin Sankranti) *milk* will be formed in the grain." The crop is ready for harvesting in the latter end of Kartik or in Aghran. According to an Urya aphorism, Kartik is the flowering season and Aghran the month when the crop matures. "Kartike na thai aphula, Aghrane na thai apachala," *i.e.*, "the crop is in flower in Kartik, and mature in Aghran." During the former of these two months, the *balunga* or wild paddy which grows in many fields is cut away, as it interferes very badly with the development of the cultivated paddy crop.

When there is a scarcity of rain in October, great apprehension is felt for the crop, and artificial irrigation has therefore to be carried out.

(b) *Transplanted rice or rua dhan.*

Nursery.—The land selected for seedlings is comparatively high, being situated by the side of the field which is to be sown. About 6 *gunts* of land are found sufficient for supplying seedlings for a field of one *mán*.

In the month of Baisakh the land is ploughed five or six times and harrowed, and in the month of Jaishti, when light rains have set in, manure is put in to the extent of two or three cartloads and then the seed broadcasted. Forty seers of seed are found sufficient to supply seedlings for one acre of land. If the weather be dry, the seed is sown in a dry condition, but if the land be moist with rain, the seed is generally soaked in water. It is put in the morning in a *gumlah* or *handi;* in the evening about 5 P.M. it is thoroughly drained, and then kept in the verandah of the house covered with straw and mats, and weighted with stones which is believed to help on and hasten germination. The next day the basket into which the seed has been drained is exposed to the sun from morning till the closing hours of the day. In the evening some water is poured over the basket, which is allowed to remain overnight in this condition. The next morning it is taken to the nursery, which two or three days previous to the sowing of the seed has been ploughed and harrowed, the last harrowing being given on the very morning of sowing. The seed is now broadcasted rather sparsely, so that the plants may not be weakened by close contact. The plants appear on the fourth day, and are transplanted when 1 to 1½ feet high, five men being sufficient to pluck off the seedlings from the above-sized nursery. These are next tied in small bundles, and then placed on a plot of ground covered with water to protect the roots from the rays of the sun, and the next morning they are carried off to the field to be sown.

Preparation of the field.—The previous crop having been harvested in *Pous*, the land is allowed to remain untouched till Jaishti, when it receives the ordinary ploughing and manuring, and in the same month is sown with the seedlings, though in many cases the transplantation is continued on to Sravan.

The proper time for transplanting will be found in the following aphorism current among the cultivators :—

"Ashare ruā dalakā,
Sravane ruā phalakā,
Bhaddrabe ruā tusukā,
Aswine ruā bisakā ;"

i.e., "when transplanting is carried out in Ashar, the plants become very vigorous, when in Sravan the outturn is satisfactory, when in Bhaddra the ears consist of husks without any grain within, and when in Aswin nothing whatever is obtained from the field."

There is another saying among the Uryas which also points to the mistake of transplanting later than Sravan. It runs thus :—

"Janma ku ruilā,
Karma ku phalā ;"

i.e., "if you transplant after Janma Ashtami in the month of Bhaddra, it is almost hopeless to get a good outturn."

Four or five men are sufficient to sow one *mán* of land. Three or four plants are held together and sown six to nine inches apart.

There is an interesting Urya proverb which is given below, indicating the distances of transplantation, and the months most favourable to the operation :—

"Mithuna chatha,
Kakara hatha,
Sinha chauta,
Kanya highan chana rau,
Tula masere,
Pani barsele,
Saba sama thula hau ;"

i.e., "if you transplant in Ashar (Mithuna), you should keep the intervals between the seedlings of the length of the diameter of an open umbrella (because in this month seedlings have a vigorous growth, and throw forth a large number of shoots which require good intervals of space between to develop satisfactorily); if in Sravan (Kakara), the distances apart should be a cubit in length (because the plants don't throw out as many shoots as when sown in the previous month); if in Bhaddra (Sinha), the intervals shoud be only four fingers (because when planted in this month no new shoots will be thrown out); if in Aswin (Kanya), the seedlings should be put in very closely (because the season having advanced they don't show any vigorous growth); and if in Kartik (Tula), the transplantation will be almost useless, as the crop would produce only straw without any grain whatever."

There is much truth in the above verse, inasmuch as it has been found that early transplantation as a rule gives better results than later on in the season, when the crop, besides showing an unhealthy growth in itself, becomes peculiarly liable to various insect pests.

The land is, especially when high, enclosed with small *auls* or embankments to keep in the rain water. After the planting, the first operation is a thorough weeding with the hand when the plants are 2 to 2½ feet in height. When there is an average rainfall, no operations are now necessary, but if water be insufficient the field has to be irrigated. Transplanted paddy suffers more from want of rain than broadcasted paddy, as may be gathered from the following saying :—

"Bua sukilā, thoibu kaihi,
Rua sukilā, pahibu kaihi;"

i.e., "if the roots of broadcasted paddy suffer at the beginning from want of rain, there is still a hope of the crop regaining its vigour, should some showers follow, but with transplanted paddy there is no such hope, as it suffers very badly from want of seasonable rain."

The paddy is eventually harvested in the month of Pous. Stormy weather and high winds in October are very injurious, as the ears get perfectly discoloured and whitish, the yield is reduced, and the quality deteriorates.

There are some coarse varieties of *sarad dhan*, among which may be mentioned *buramunda* and *chakrakamuda*, which are grown sometimes on saline lands adjoining the sea. The land under such cultivation is ploughed and harrowed three or four times, and then well manured with pond mud. Before sowing in the month of Ashar, the seed, which is kept tied up in straw, is immersed in water for a day or two, and when it is found to have germinated, it is broadcasted on the paddy-field in the usual way. The crop is harvested generally in Aghran or Pous, when the ears alone are cut off, the stalks being allowed to remain on the ground.

3.—*Dalua dhan.*

Soil.—This variety of paddy is generally grown on low, swampy or marshy grounds, or rather those which are able to retain a sufficient depth of water; for instance, the lands lying along rivers and creeks. A clay land which is subject to tidal inundation is generally chosen for the purpose, so that irrigation may be rendered very easy and advantage also taken of the silt of tidal waters. When this clay contains a large amount of decayed vegetable matter, it is regarded as the best for *dalua* cultivation. A mixture of sand with silt has always the effect of deteriorating the crop.

Cultivation.— The crop may be either transplanted or broadcasted. When the former method is chosen, a site is selected for the nursery close to a piece of water. It is curious to observe how all little corners of fields, the field drains, and all similar available patches of land, are taken up for the seedlings. All that is necessary for such land is that it should just hold enough water to keep it moist. In the month of Kartik, the nursery land is given only one ploughing and harrowing. This is found quite sufficient, as the ground having been under water is still soft. The seed is soaked in a large earthen vessel for 24 hours. It is then drained and the seed received in a flat basket, which is then covered with straw and kept within the house for about two days, when it is found to germinate. Should it not have germinated by the end of the second day, some lukewarm water is sprinkled over the seed to hasten the germination. The seed is then taken to the nursery to be broadcasted at the rate of 30 to 35 seers per *mân* of land to be sown with seedlings. This broadcasting, as a rule, is very thick. The land is then harrowed to cover the seed and protect it from the depredation of birds. The plants appear after four days. Nothing is done till they have attained a height of 1 foot or 18 inches, when they are plucked and tied in bundles. Should there be any delay in the preparation of the land to be sown with the seedlings, these bundles are inserted into thick puddly mud so that the roots may not be destroyed. Here they may remain without injury even for a week, but the sooner the transplanting commences, the better. If the land be compact and very clayey, it has to be ploughed and harrowed once, and then watered; but if it be of an alluvial nature, no such preparation is required. The bundles of seedlings are carried to the field and sown by the hand, four or five plants being placed in each hole at distances six inches apart. Sometimes a whole *mán* is sown in a single day, when no less than twenty men are required for the purpose. But the majority of cultivators take three or four days, or even a week, to sow a full *mán*. These transplanting operations are generally carried on in the month of January. Water is absolutely necessary till the end of February, and any scarcity before this time injures the crop. But the greatest damage is done by hail and storm in Falgun.

Manure.—When the crop is grown on alluvial land (*pattu*), the use of manure is considered prejudicial. Cowdung under such circumstances tends to produce an exuberant growth of stem and leaf with a proportionate loss of grain. The harvesting is commenced in Chaitra and continued till Baisakh.

Diseases, pests, &c., injurious to rice.

(1) *Kalamandi.*—This, as the name implies, is a black-headed grub that makes its appearance in paddy-fields generally after floods, adding considerably to the loss of crops. It appears probable that the ova are brought down by flood water. The pests multiply with great rapidity, and in a short time deprive the plant of every green blade. So great is their destructive power that in one night they make short work of whole fields. Such was the case in certain parts of the district in the years 1872 and 1879, when wherever their ravages extended neither *biali* nor *sarad* was saved. Heavy showers destroy these caterpillars, though not before they have eaten right into the stems, beginning at the top.

(2) *Locusts.*—These sometimes prove injurious to rice crops, which suffer greatly from their ravages. They seem to come in from the Tributary Mahals, and then passing through Darpan fly across the district by Kendrapara, until they disappear as they approach the eastern coast.

(3) *Manjikura.*—This is a disease found especially in the *dalua* variety. It appears in December, when the plants are about 6 inches in height, being supposed by raiyats to be induced by rainy or cloudy weather. The tops of the plants are first affected, and then gradually the growth of the entire plant is impeded, so that the ears of corn remain undeveloped and the outturn thus seriously affected.

(4) *Poka.*—This is the generic name for an insect, and is often applied by the raiyats to a small black winged insect which appears during a year of excessive rain, generally in the month of Sravan. It first attacks the ears and then eats its way right down to the very roots, so that the whole plant withers. On each plant some 10 to 20 insects may be observed, and when the plants are shaken, the field literally swarms with these flies. They do not, however, spread from field to field, their depredations being confined only to those which they have first attacked.

(5) *Dhoblipoka.*—This is an insect that is reported to have done great damage to the rice crops in the Jajpur subdivision in the year 1872-73, when all the leaves were eaten away and the new buds destroyed until little or nothing was left of the crop. To me it appears that this insect is the same as the *Kalamandi* described above, having a more or less whitish body and a black head.

(6) *Haldi gundi.*—This insect makes its appearance on *dalua* fields in the month of January, destroying the plants from top to root.

(7) *Ghorapoka.*—This insect is white in colour and attacks the rice crop in Aswin.

(8) *Jhitika.*—This is a winged insect about 1½ inches in length, which attacks the rice plants just as they are emerging out of the ground. As far as I could gather, it seems to belong to a variety of small locusts.

(9) *Pologona.*—This is a black insect about an inch in length which first attacks the ears of the plants, gradually working its way down to the stem and roots until the plant dies.

(10) *Dhauris.*—This disease seems to be a kind of fungoidal growth which does not injure the crop very much.

Besides the above, the paddy crop is damaged considerably by other causes such as hailstorms and drought. Scarcity of rain in the months of September and October considerably reduce the outturn of the *sarad* variety. Drought in the month of May proves fatal to young *biali* plants. Deficiency of showers in June and July also tell seriously on the paddy crop, as rain is required in these two months to push on the sub-soiling operations. As in other parts of Bengal, floods in July, August and September are destructive in their effects. The floods in the two latter months do more damage to the crop than those in July. "Sravan duhi, badhui nahi; Bhaddra duhi, kichu kichu rahi; Aswin duhi, sarbosa jahi;" *i.e.*, if there are floods in Sravan, the paddy crop will not be damaged very much; if in Bhaddra, then a portion of it may be saved; if in Aswin it will be totally destroyed. On the seaboard tract, the paddy crop has on certain occasions been totally destroyed by storm-waves, which fortunately, however, are not of frequent occurrence. Birds and animals, such as sparrows, deer, pigs, elephants, also prove destructive, though care is taken to protect the crop from their ravages.

Harvesting of rice, &c.

Each of the different kinds of paddy described above has its own harvesting season. The *biali* crop is generally cut in the month of Bhaddra. The season for harvesting *sarad* extends from the end of Kartik to the beginning of Magh, the *laghu* variety being cut in Kartik and Aghran, and the *guru* in Pous and Magh. The *dalua* harvest, which is the latest, commences in Falgun and continues on into Baisakh. According to an Urya proverb, the paddy crop should be cut before it is too mature: "Birhi, barguri pacha, dhan katibo kacha," *i.e.*, *birhi* and *barguri* may be cut when fully ripe, but not so *dhan*.

Reaping.—About 15 or 16 men are found sufficient to reap an acre of land. The work is also done by poor women of almost all castes. The operation is generally carried on in the morning, from 6 to 9 A.M., before the stalks get dry and brittle. To facilitate the cutting, the crop is often first laid low by a bamboo, especially those varieties which are grown on rather high land. With the *biali* crop, and with some varieties of *sarad*, some 6 to 12i nches of the stalk are left on the ground, while with the *laghu* variety only 3 or 4 inches of the stalk are left behind. In *guru* and other varieties, where the stalks being under water are perfectly useless, the ears alone are cut off. These two methods are respectively known as *kachra* and *kalai*, accordingly as the stalks are cut off at the base or higher up the stem below the ear. With the left hand the reaper holds a clump of stalks which is cut off by a small sickle or *dao* held in the right hand. The paddy thus cut is allowed to lie in the field in rows. Some cut off the ears from the straw on the field, while others carry home and stack the entire stalks. In either case, the plants are collected first of all in small bundles known as *berias*, which are tied together in larger sheaves called *boris*, and then carried away to the homestead by some in carts and by others in *banghis*. The spot on which the sheaves are collected into heaps on the field is called the *kachara*, and the place where they are heaped up on being brought to the homestead is known as the *khala*. Instead of these heaps, the stalks are sometimes put into regular stacks. In both cases the ears are inside. The stacks are generally of a cylindrical form with a conical roof, which allows the rain water to drain out without injury to the paddy within. The dimensions of the stack vary according to the produce. The outturn of one acre could be stacked in one having the following measurements:—Circumference 33 feet, height up to the eaves 4½ feet, length of sloping roof from the apex to the eaves 7 feet. The cost of building such a stack would not exceed six annas, as three men would be found sufficient to complete the stack in a day.

Threshing.—This is done in two ways, the first being to crush the sheaves by bullocks. A post is put up in the centre of the threshing-floor or *bengala*, and four or five bullocks tied in a line are driven round and round the post, treading on the stalks which are spread out on the floor. The straw which is thus separated out is known as *khuta*, and is used as fodder or fuel. The second method of threshing is as follows:—A plank is placed on an inclined plane about three feet high at the upper end. The thresher stands at the head of this plane. Holding a sheaf with both hands with the ears off him, he strikes it several times with all his force on the plank, until all the grain is beaten out. The straw thus obtained is called *chhan*, being used for thatching purposes.

Winnowing.—When the grain has been thus separated, it has to be cleared of all refuse. Advantage is therefore taken of a windy day to winnow the paddy. This is done by letting paddy fall from a basket held over the head. The wind blows away the lighter chaff, while the clean grain falls at the winnower's feet. The plan is also followed of swinging a *kula* over the heap of paddy and chaff, when the latter is blown away. Such a plan takes a much longer time, but has to be followed when there is not much wind.

Harvesting wages.—*Vide* Chapter II.

Storing.—The cleaned paddy has next to be stored. Before this is done, however, certain demands have to be met. In order to pay the rent, some of the paddy is sold and thus converted into coin; the debt of the mahajan is cleared in kind; a small portion is kept out for immediate consumption, and the rest is stored. The usual practice is to put the paddy into a large basket made of bamboo. This is called a *doli*. Its bottom and sides are plastered with mud to keep out the air. The paddy is then put in and covered with straw, which is also plastered over with cowdung and mud. This basket is kept in a corner of the room, and paddy taken out from time to time as required. When a large quantity has to be stored, a stack is constructed out on the open ground. First of all, some straw is spread on the ground, and then a layer of paddy laid over the straw. This layer is next enclosed all round by some more straw, which folds inwards. In this way, the whole stack is built up with paddy in the centre and a covering of straw about 6 to 9 inches on the outside, which serves as an excellent protection from rain. The roof of the stack is also made conical, facilitating the trickling out of rain water, and thus the paddy within is kept perfectly dry. The height of one of these stacks as taken by me at Patamundi was 24 feet, and the circumference 85 feet; but they generally have much smaller dimensions, some being less than quarter the size. The cost of labour of this stack was Rs. 6 and the straw Rs. 3. It was capable of storing 300 *bharans* of paddy, representing a money value of Rs. 1,200 roughly. The great disadvantage in storing by this method is that the stack is often attacked by white-ants, which eat into the straw and lay bare the paddy to the effects of wind and storm and the ravages of birds and insects. The store-houses of mahajans are peculiarly built. Some raise stacks of the kind above described, but more generally the custom is to store the paddy in houses constructed entirely of wood, or in those having mud walls and thatched roofs. The building is raised 2 or 3 feet above the ground. The only entrance is by a very small door, which is reached by a ladder, and which is always made secure by a padlock. Such houses are capable of holding as much as Rs. 2,000 or Rs. 3,000 worth of paddy. Some raiyats also follow the practice of storing their paddy in a pit dug in the homestead, but eventually when the rains come on in Ahsar or Sravan, the grain has to be removed into the house, where it is kept in baskets as described above.

Husking.—When paddy is converted into rice, it is husked usually in a *dhenki* or pedal, which has been described in a preceding page. The work is done by contract, the three women who are employed on it getting ⅙th of the husked paddy or rice. Thus from 24 seers of paddy, which would give about 12 seers of rice, two of these seers would be given for labour. The ordinary pestle and mortar is used only when small quantities have to be husked.

Rice is prepared from paddy in two ways, viz.—

(*a*) By drying the paddy in the sun, and then crushing it in the *dhenki*. This is known as *atáp* rice; and

(*b*) By boiling the paddy, and then drying it in the sun and crushing it in the *dhenki*. This is what is generally eaten, being known as *sidha* rice.

The outer husk of the paddy which is thus removed is called *tunsa* and is used for fuel, whereas the fragments of husks and the outer shell covering the grains of rice go by the name of *kunda*, and form a favourite fodder with cattle. Three seers of paddy would yield about ¼ seer of *tunsa* and the same quantity of *kunda*.

I.—Cost of cultivation of broadcasted rice per standard acre.

	Rs.	A.	P.
Five ploughings and five harrowings at 2 annas per labourer and 6 pice as hire of each plough (three ploughs ploughing one acre in one day) ...	3	4	2
Manure, 45 maunds per acre @ 3 pice per maund and 9 pice for spreading ...	2	4	0
Seed, 40 seers @ Re. 1 per maund ...	1	0	0
Repairing embankments ...	0	12	0
Weeding ...	1	4	0
Reaping, binding and carrying to threshing-floor ...	1	8	0
Threshing and winnowing ...	0	9	0
Average rent of land ...	3	2	0
Average magan on rent, which varies from 1 to 3 annas per rupee ...	0	6	0
Total ...	14	1	2
Yield—			
Grain.—Average = 17 maunds, which at 14 annas per maund =	14	14	0
Straw.—1½ kahans at 8 páns per rupee (16 páns = 1 kahan) = ...	3	0	0
Total ...	17	14	0

II.—Cost of transplanted rice per standard acre.

	Rs.	A.	P.
Nursery—			
Ploughing and harrowing ...	0	6	0
Manuring ...	0	6	0
Seed (1 maund @ Re. 1 per maund) ...	1	0	0
Pulling up plants and carrying to fields (8 men @ 6 pice each) ...	0	12	0
Field—			
Transplanting ...	1	4	0
Preparation of field, ploughing and harrowing ...	3	4	2
Manuring ...	1	14	0
Repairing embankments ...	0	12	0
Reaping, binding, carrying, threshing, and winnowing ...	2	1	0
Average rent and magan ...	3	8	0
Total ...	15	3	2
Yield—			
Grain.—18½ maunds at 14 annas per maund ...	16	3	0
Straw.—1½ kahans ...	3	0	0
Total ...	19	3	0

III.—Cost of Biali rice per standard acre.

	Rs.	A.	P.
Eight ploughings and harrowings at 3 annas 6 pies for each ploughing and harrowing (three ploughs ploughing one acre in one day) ...	5	4	0
Manuring ...	1	14	0
Seed ...	1	0	0
Weeding and raking ...	1	12	0
Reaping, &c., threshing and winnowing ...	2	1	0
Rent for half-year and magan ...	1	12	0
Total ...	13	11	0
Yield.—Grain 15 maunds and straw about 1 kahan ...	15	2	0

The average yield of paddy in Cuttack varies from 15 to 20 maunds per standard acre, which is equivalent to about 11 maunds or 902 lbs of clean rice per standard acre.

Suggestions for improvement.—The rice of the district is generally of an inferior and coarse quality. There are some tracts, however, *e.g.* in Dalijora and Alti, in which fine varieties, such as the Dewanbhog, Najubadan, Machakanta, and Solhari, are grown. In the absence of statistics, no approximate idea can be given of the area cultivated with these varieties, but I think it may be safely asserted that the area on the whole is very limited.

By the raiyats this restricted cultivation is attributed to the want of any demand among themselves for fine rice. Their palates and stomachs are better satisfied, they say, with a good meal of coarse rice than with one of fine rice. Hence, as their prime object in cultivation is to find food for themselves and their families, the staple generally grown by them must be of an ordinary quality. This resolves itself really into a question of supply and demand, in which it may be argued that the supply would create the demand, *i.e.*, raiyats would consume fine rice, if there was enough of it. A more likely cause, which restricts the area of fine rice, seems, to my mind, to be the greater amount of care that its cultivation demands.

The finer varieties are more delicate than the coarser kinds, more liable to be affected by peculiarities in the site of the fields and in the composition of the soils in which they are grown, and more likely to suffer from unseasonable weather. The raiyats therefore prefer to grow a crop of which they are more or less certain than one which may fail and entail loss and leave them practically without food. Without a chemical analaysis of the different kinds of paddy soils to be met with in the district, and without actual experiment, no conclusions can be drawn about the suitability or otherwise of the Cuttack soil for fine rice, or about the comparative outturns of coarse and fine rice. As such experiments would require constant watching, I would suggest that they be carried out on irrigated and unirrigated lands by the officers of the Irrigation Department. They may also be introduced with advantage in Government and Wards' estates.

As regards the use of manures for the paddy crop, the raiyats of Cuttack have much to learn from those of other districts. The raiyats in the neighbourhood of the Burdwan farm, and generally throughout the district of Burdwan, treat their paddy-fields liberally with dung and oilcake. Dung is used to a certain extent in the district, but the raiyats have still to be taught that the application of ground oilcake to paddy is likely to be attended with remunerative results. For *biali* paddy it may be used with advantage as a top dressing. To those who can afford it, in the place of bonemeal and saltpetre, to the first of which there is likely to be the strongest objection, the latter alone may be recommended as an excellent manure for top-dressing all kinds of paddy. The use of an inverting plough, in whatever kind of soil it can be worked with ease, as, *e.g.*, in *biali* lands, would prove a great advantage, as such a plough would expose the soil to the influence of the sun and atmosphere. Green manuring with such crops as *indigo*, *sunn* and *dhainche*, all of which grow in Cuttack, is practised with beneficial results for paddy in other districts, and may therefore be similarly adopted with advantage by the Urya cultivators, especially for their extensive *sarad* lands which now so tax the supply of dung available in the district.

4.—*Mandia* (*Marua—Eleusine corocana*).

Description.—*Mandia* is an upland cereal. It attains a height of four or five feet, and bears grains of a reddish colour, very much like a mustard seed.

Soil.—It is grown on the high lands of the district, flourishing alike in clayey and loamy soils, as well as in sandy loams. Two-cropped or *dofasal* lands are generally selected for the cultivation of this crop, which is followed by *rabi* crops of all kinds. In some localities, however, its cultivation is carried on in *ekfasal* lands. The cereal is never grown on low-lying lands, as stagnation of water is very injurious to its development.

Mode of cultivation and manuring.—Manure is not used for the cultivation of this crop, which is almost always transplanted. The site selected for the nursery is by the homestead, being the land which has received all the refuse of the house. It is of a more or less clayey nature, and is locally known as *kala* or black land. This land is dug with the *kodali* in the month of Jaishti, when the first showers have set in. Should there be no rain at this time, the ground is well watered before being dug. The clods are then broken with a hand *mugur* or hammer, and the ground well levelled with the hand. The seed is broadcasted in the nursery and covered with earth by the hand. In four days the plants begin to appear above ground. It is necessary to give an additional watering should there be a deficiency of rain. The land is now left alone for the next two months, when the seedlings attain a height of a foot, the only care taken being to keep the soil moist.

The field to be sown with the seedlings is ploughed four or five times, and harrowed in the months of Jaishti and Ashar in the usual way. As soon as the seedlings are ready, advantage is taken of the first showers to transplant. They are plucked off with the hand from the nursery, and immediately removed to the field, where they are planted at intervals of a foot, two or three plants being put into each hole made for their reception. Care is taken that only such a number are removed from the nursery as can be planted on the same day. In this respect they differ from transplanted paddy seedlings, which do not suffer by being kept in mud for two or three days, after they have been plucked off from the nursery. After a month the seedlings increase in height by about six inches, when the land is cross-ploughed and harrowed to loosen it. Eight days after this, the plough is driven once more in the direction of the line of plants, and the land is thus partially ridged so as to cover the roots.

Harvesting.—Nothing is now done till the end of Bhaddra, when the crop is ready for harvesting. The ears alone are cut at the top, and the stems are left on the ground to be eaten off by bullocks. When the crop is heavy and is grown over a large area of land, the corn is threshed in a *bengala.* Lighter outturns are immediately put into the *dhenki* to be threshed and husked. *Mandia* grain is then converted into flour in a hand grinding mill, and used for making bread among the lower classes. Some simply boil it in water and others boil it after mixing it with rice.

Pests, injurious weather, &c.—Heavy showers of rain produce an early crop, when the yield is considerably lessened. On the other hand, a slight deficiency of rainfall injures the crop totally. The only insect pest which has been found destructive is a caterpillar about half an inch to an inch in length.

5.—*Cheena* (*Cheena—Panicum miliaceum*).

Description.—*Cheena* is a millet cultivated only when the *sarad* crop fails, as it furnishes farinaceous food for the poorer classes of raiyats, who boil it in the same way as rice, and, when they can afford it, cook it also with milk. It is, however, considered very heating, and has very little taste or nourishment to recommend itself to all classes of raiyats.

Soil.—The roots of the *cheena* plant being very delicate, the crop does not flourish in lands that are either too stiff or too dry. *Sarad* lands with a small percentage of sand are considered suitable. Clayey loam, and lighter loams on which *biali* has been raised, are also used for the cultivation of the crop. *Khal* or low lands by the side of *nalas* and creeks are selected very often as being convenient for irrigation. Fields may also be observed here and there containing silt deposits of rivers where this millet is found flourishing.

Mode of cultivation and manuring.—The land is ploughed in October (Kartik) three or four times, followed each time by a harrowing. In this month, there is no necessity of irrigating the fields. Two or three days after the third or fourth ploughing, when the land has been well pulverized, the seed is broadcasted. This seed is first well mixed with slightly moist sand, and the seed and sand both broadcasted together, the object being to ensure the equal distribution of seed. Should the crop be sown later on in Aghran, Pous or Magh, as would be the case when grown on *sarad* lands, and should the land be dry, it is first irrigated and then well ploughed and harrowed until a good tilth is obtained. The seeds being very small and light, the broadcasting is always followed by another ploughing and harrowing to cover them thoroughly. The plants spring up in eight or nine days. Water being very essential for the crop, irrigation becomes indispensable now, if there be a deficiency of rainfall. Drains are cut in the field, which is irrigated from the nearest pond or *nala.* The land is allowed to lie untouched till harvesting time, the crops being ready for cutting in three months. No manure is needed for the crop, as it is generally grown on a rich loam.

Harvesting.—The operations now are similar to those of paddy. The crop is cut with an ordinary sickle. About six inches of the stems are left on the ground, and the rest carried away to the homestead to be threshed by bullocks. The straw is used as cattle fodder and fuel, and the grain is boiled, dried and husked in a *dhenki*, and then used for food in the same way as rice.

Yield.—One acre of land produces about six to eight maunds of grain in good seasons, the plants attaining in this case a height of three or four feet. In bad seasons it is difficult to raise even a maund. The average outturn may be taken as three maunds per acre.

Diseases and pests.—The crop is free from all diseases and pests. The only obstacle in its cultivation is insufficient moisture. A dry hard soil affects the delicate roots of the plant very injuriously.

Cheena after the biali crop.—When grown on *biali* lands instead of the regular *rabi* crops, as is sometimes the case, the seed is sown in Bhaddra and harvested in Kartik. The crop may be sown, however, at all times of the year. In some parts of the district the sowing and harvesting operations are carried on simultaneously. *Cheena* is considered injurious to the growth of other crops which follow it.

6.—*Suan* (*Sawan—Panicum frumentaceum*).

Description and soil.—*Suan* is a coarse millet yielding farinaceous food like *cheena*. It is grown on *toila* lands, which, being generally full of stones and gravel, will not grow paddy.

Rotation.—*Suan* often follows the *kangu* crop (*Panicum italicum*) after a year, but *kangu* itself is never grown on the same plot of land for two successive years, as it flourishes only in newly-burnt jungle land.

Mode of cultivation.—The soil is ploughed twice, and then the seed broadcasted in the month of Jaishti. The plants grow to a height of two feet in a month and-a-half, when the land is well weeded. Rain is required till the month of Bhaddra. During the first stages of the growth of the plants a few light showers are found sufficient, but a larger quantity of water is needed immediately before the flowering season, when the plants are well established and about two feet high. When *suan* is found growing wild in paddy-fields, it is cleared off, especially during the operation of *bensan* or sub-soiling in the month of *Sravan*. When its stalks are found left with paddy stalks, they are removed during ploughing and not ploughed in for manure, as the presence of the plant is considered prejudicial to the growth of the paddy crop.

Harvesting.—The crop is cut in Bhaddra when it is fully ripe. About six inches of the tops are taken, and the rest of the stalks left on the ground.

Threshing.—When there are small quantities, threshing is done with the feet, but the *bengala* comes into requisition for heavy outturns. The grain is dried in the sun for two days by the door of the homestead, and then stored in baskets or in bags made of straw. Before being used as food, it is boiled and then dried, and then husked in the *dhenki*. The consumption is confined to the lower classes, who prepare a gruel from it in plain water and eat it with *sag* and vegetables.

7.—*Kangu* (*Kangani—Panicum italicum*).

Description.—*Kangu* is a rainy season crop sown in Ashar. It is grown chiefly by the hill tribes of the district, and its cultivation is therefore very limited, being confined to the forests on the western frontier.

Mode of cultivation.—A plot of land having been selected in the midst of the jungle, the trees are set fire to, and the ashes which are left on the ground are then ploughed in with the first showers of rain. After a single ploughing the seed is broadcasted. Water is very necessary at this time. The plants, which generally germinate three or four days after being sown if the rain is sufficient, are attacked very badly by white and black ants when there is no rain now. Too much rain, however, before the plants have sprung up, affects the crop injuriously, as the seeds rot away without germinating. After a month, when the plants have attained a height of 1½ feet, the land is well weeded with the hand, and then fenced round to protect the crop from cattle and elephants.

Harvesting.—At the end of Sravan, when the plants are about 2½ feet or 3 feet high, they begin to flower, and a month after the crop is ready for harvesting. This operation is done with the sickle. The tops alone are cut off for the grain, while the stalks are left on the ground to a height of about 3 feet. In a good season the plants attain the height of an average sized man, but in unfavourable weather they do not grow more than 2½ or 3 feet high. After being cut, the crop is immediately taken home and kept at the homestead for two or three days to dry in the sun, when it is next threshed. This is done by treading with the feet. The grain when dry is loaded in baskets and kept in the sleeping room on *machans.* When needed for consumption, small quantities are taken out and husked in the *dhenki.* The husked corn is introduced into boiling water and well stirred and cooked like *khir.* Those that can afford it take it mixed with *gur* and milk.

8.—*Makka* (*Maize—Zea Mays*).

Extent of cultivation.—Maize holds an insignificant place in the cultivation of the Urya raiyats, and is generally found cultivated in very small plots of land around the homestead, chiefly for home consumption. Nearer town, however, it is rather largely grown by kitchen gardeners for the market.

Varieties.—There are three varieties known, viz.—

(1) *Haldia,* (2) *Nalia,* (3) *Sabuji,* all of which are distinguished according to the colour of the grain. The quality is not very superior, the grains being generally thin and small in size.

Soil.—Maize is cultivated in almost all kinds of lands, whether loamy, clayey, or alluvial.

Mode of cultivation.—The land is ploughed two or three times and harrowed once in the month of Baisakh. Small shallow holes are made in the ground with the *kodali* at distances of a cubit apart. In the month of Jaishti, seeds are placed in each of these holes, generally two or three in each hole, and a handful of cowdung manure is then applied over the seeds, just sufficient to cover them. On the next day water is sprinkled over the holes with the hand. When the plants come up after three or four days, the land is watered thrice a week. In the month of Ashar, when they have grown a foot high, the soil round the roots of the plants is loosened with the *kodali.* This hoeing serves also to eradicate weeds and noxious grasses. If the rains fail now, the land is again watered once a week. The flowering season commences in the month of Sravan. In the month of Bhaddra, when the fruit has matured, the crops are plucked off by the hands, and the leaves, stems and tops set apart for fuel.

Disease and pests.—This crop is not subject to any disease or to the attacks of any insect pest, but it suffers very much from the ravages of hogs and jackals.

9.—*Gahama* (*Wheat—Triticum Sativum*).

Extent of cultivation.—Wheat grows in the Cuttack district in small quantities which are not sufficient to meet the local demand. Its cultivation is so insignificant that no separate figures regarding its area have been submitted by the Collector for any of the forecasts or statistics published by the Agricultural Department. From an old Administration Report of the district I find that in the year 1882-83 the total area under its cultivation was estimated at about 500 acres.

In the Jajpur subdivision I noticed its cultivation chiefly in the vicinity of the Buree, Jajpur, and Khunditar circles, but the crops were generally very poor, and were obviously planted in fields thoroughly unsuitable for their cultivation. In the Kendrapara subdivision, I observed that the crop was grown in loamy soils, and as a consequence it was far from flourishing. The cultivators, however, seemed to have some idea that wheat requires a clayey soil, and so selected the stiffest of their loamy soils for the growth of the cereal.

Soil.—As noticed above, the cultivators seem to know that wheat grows best on clayey soils, but the crop is grown generally on *dorosha* or loamy lands. Pattu or alluvial deposits are also selected for its cultivation.

Rotation.—In rotation the crop generally follows the upland paddy crop.

Mode of cultivation.—The first ploughing to the land is given generally in the middle of Aswin. The ploughings continue at intervals of three or four days, each ploughing being followed by the harrow until the land is reduced to a fine tilth. It is found that nine ploughings and harrowings are generally sufficient. The raiyats are very particular to have the land soft and dry before they broadcast the seed. As a rule very little or no manure is applied, and thus it is that the crop, which requires a liberal manuring, gives but a poor outturn. Seed is sown at the rate of about 25 seers per acre of land in the month of Kartik. Immediately after the sowing, the land is once ploughed and harrowed to cover the seed. In about eight days the plants appear. Nothing is done now till the harvesting period, weeds even being allowed to grow in the wheat field. Irrigation is resorted to by some when the rainfall is below the normal in the month of Pous.

Harvesting.—In the months of Magh and Falgun the flowers begin to bloom, and it is at this period and subsequently that the development of the crop is checked by cloudy or foggy weather. If all goes well, the crop is ready for harvesting in Chaitra. A portion of the stalks, about six inches, is left on the ground and the rest cut by a sickle. The wheat is not allowed to lie on the ground, but brought home the very day it is cut. It is then threshed in the usual way by bullocks. The grain is next winnowed, while the straw is laid aside as fodder for cattle.

Disease and injurious weather.—As stated above, continuous cloudy weather or heavy rain during the months of February and March is very injurious to the crop.

10.—*Jaba* (*Barley—Hordeum Vulgare*).

Soil.—Barley grows principally on *dorosha* or loamy soils, being cultivated especially in those parts of the country which are subject to permanent inundation during the rainy season. After the receding of the waters in Aswin and Kartik, those tracts which are rather elevated, and which therefore readily dry with the sun's heat, are selected by the raiyats for tillage.

Rotation.—On *biali* lands this crop may be grown in rotation after the paddy crop; but as it is not very paying, this practice is not usually followed, the raiyats prefering to take *birhi* and *mung* after the *biali* cultivation.

Mode of cultivation.—The land is ploughed five to ten times and then harrowed for a period of fifteen days from about the 22nd of October to the 8th of November, the seed being generally sown in the first week of the latter month at the rate of about 25 or 30 seers per acre of land. Should there be heavy rain at this time, the whole crop is lost, but with clear sunshine the plants spring up in three or four days. No weeding or any other operation is necessary. Towards the end of Pous, when the plants are beginning to develop their ears, some water is required, and irrigation has therefore to be resorted to when there is an absence of showers at this time of the year. The flowering season commences a month after, and the seed matures in Falgun. The crop is now ready for harvesting, the plants having attained a height of two-and-a-half to three feet.

Harvesting, &c.—The cutting of the crop is done in the same way as that of paddy; the stalks are left in the ground to the height of a span, the rest being cut away by the sickle. The harvesting is generally done in the morning while the dew is still on the ground. The stems are bound in sheaves and taken to a clean spot near the homestead, where they are left exposed for two days, after which they are threshed by the *bengala.* The grain is next winnowed, and the ears are subjected to another threshing to separate the *singhs* or horns of the grain, and then winnowed. The grain is then stored or sold and the stems used for fuel. There is, however, a prejudice among the raiyats to turn the stems to this use, as would appear from the following saying which is prevalent among them:—"*Iswarare jottā jālleelay aparadh hoi,*" *i.e.*, it is a crime to use the stems for fuel, as they represent the hair of Mohadeva.

After the threshing, barley is washed and then crushed in a *dhenki.* The husks are removed and the grain fried, after which it is ground a second time and converted into flour. When in large quantities this is done in the *dhenki*, but when the quantity is small it is done in the ordinary grinding-stone. The flour is cooked and eaten with *gur* or *dhai*. Sometimes the whole grain is cooked and eaten like rice. It is supposed to be very cooling, and is therefore not eaten during the rainy months, as it produces a disaffection of the throat.

Diseases, pests, &c.—At the end of Aghran, the *kalamundi* insect attacks the crop. *Paschim* winds in the end of Magh destroy the flowers.

Pulses.

11.—*Muga* (*Mung—Phaseolus mungo*).

Varieties.—There are three varieties of this crop to be found in the district, viz.—

(1) *Savri muga* or *dhara muga*, having light coloured seeds corresponding to the ordinary *sona mung* of Calcutta.
(2) *Kara muga* with dark coloured seeds.
(3) *Jhái muga* in which the seeds are whitish, called also *Chaitra muga* from the fact of its being harvested during that month. This is inferior to the two preceding varieties.

Dhara and Kara muga.—*Soil.*—These two are grown on a loamy soil. Upland aus paddy lands are generally selected for the purpose, as they flourish only in well-drained fields. The last variety, which is grown only to a very limited extent, does not suffer much from an excess of moisture, and is hence found cultivated on *sarad* lands.

Rotation.—The *kara muga* and the *dhara muga* are very often mixed with *birhi* and sown as a rabi crop after *biali* paddy. Some raiyats, however, sow the seeds of these two pulses separately. In both cases, they immediately follow *biali* paddy in rotation.

Mode of cultivation and harvesting.—The land is prepared and the seed sown in Bhaddra and Aswin. In five or six days the seeds germinate. No manure is applied, and the crop is left untouched till the time of harvesting. The plants begin to flower in the month of Aghran, and are ready to be taken off in the end of Aghran or beginning of Pous. When sown with *birhi* the crop is cut with the sickle, after which it is taken home and threshed with sticks and the seeds thus beaten out. The dry stalks are used for fuel, and are also given to cattle.

Jhái muga.—*Soil and rotation.*—This variety grows well on a clayey soil, being taken generally after the harvesting of *sarad* rice.

Mode of cultivation and harvesting.—In the month of Aghran, the land is ploughed twice or thrice and then harrowed till quite level, when seed is broadcasted in the usual way. After the sowing another harrowing is given to thoroughly cover the seed. In four or five days the plants will be found appearing above ground, and will begin to bear flower in Magh. In the month of Chaitra the crop will become quite dry and will be ready for harvesting.

Outturn.—The average outturn per acre of land amounts to 3 or 4 maunds.

Diseases, pests, injurious weather.—Cloudy and foggy weather during winter is prejudicial to the outturn of the crop.

12.—*Birhi* (*Birhi kalai—Phaseolus radiatus*).

Extent of cultivation.—In the last *rabi* forecast of 1891-92 published by the Director of Agriculture, 86·8 square miles was the area estimated to be under the cultivation of this crop. The largest amount of the pulse is grown in the subdivision of Kendrapara.

Soil.—The soil most suitable for the crop is clay, with a certain admixture of alluvium. It does not grow very well on greatly elevated lands, although cultivated very often on such lands. Plots along the riverside give the most profitable outturn.

Mode of cultivation.—Should there be any showers after the *biali* crop has been cut in Bhaddra, the raiyats have to wait till the land is dry. When so, it is twice ploughed and harrowed, and then left for two or three days. It is then given two more ploughings. The seed is next sown broadcast and the plough once more taken over the land followed by the harrow. The plants appear above ground four days after the sowing of the seed, as would appear from the following aphorism:—

"*Birhi Chauti*
Khasa Mhuti,"

i.e., "*Birhi* germinates on the fourth day, whereas *Khasa* (*til*) germinates as soon as the seed falls out of the hand." As a matter of fact, however, *til* seldom germinates before the eighth day.

The after treatment consists of two cross ploughings which are given in order to allow the rain water to find a ready outlet. The crop is left untouched now for the next four months. During this time heavy showers injure the crop, which is sometimes wholly lost when the land is inundated. The flowering season commences in Kartik, a month very crucial to the crop. The grain begins to form fifteen days after, and the crop matures in the following month, when it is ready for cutting. The harvesting is sometimes delayed till Pous. If the land be good, the plants will have by this time attained a height of one foot, but in a *nirasha* or poor soil they will not have grown higher than half a foot.

Harvesting.—The harvesting is generally done by the hand, the plants being plucked off the ground. If the soil be very loose, the roots also come up with the stems. When the stems are stout and thick they have to be cut by the *kasti* or sickle. According to the nature of the crop is regulated the number of men required for the reaping. For an ordinary crop, ten men working for two days would gather in the whole crop from one *mán* of land. After being cut it is tied in bundles and taken to dry. It is spread out in the sun on some convenient spot, then stacked and threshed by cows, and then winnowed. The stems are used as fuel, as they are too dry for bullocks; the leaves are eaten by cattle, and the grain taken home and stored in straw bags, and then sold when required by the mahajan, a small portion being used for home consumption.

Outturn.—The yield per acre is about 3 maunds.

Diseases, pests, &c.—(1) If the rains be heavy in Bhaddra, the crop is attacked by swarms of black insects about two inches in length, which cover the field so thickly that one cannot place one's foot on a bare piece of ground within the crop area.

(2) A white insect about half an inch in length, called *Nauri*, also attacks the plants in Aswin, when they have attained a height of half a foot. These do not do much damage.

13.—*Kulthi* (*Kurthi—Dolichos biflorus*).

Extent of cultivation.—The area under *kulthi* is very similar to that under *birhi*, but the largest amount of it is grown in the Sadr subdivision, where about 52 square miles are estimated to be under the cultivation of the crop.

Soil.—The soil best suited for this crop is a mixture of sand and clay. High lands are generally selected by raiyats for its cultivation, but in some parts it is grown on low *khal* lands. The produce in such cases is invariably very small. Stiff clayey lands with a large amount of tillage may produce a satisfactory crop, but the outturn is never so large as on a looser soil. Lands subject to inundation are used after the floods have receded.

Rotation.—Being one of the regular *rabi* crops, and grown on *dofasal lands*, *kulthi* generally follows *biali* paddy. It is sometimes sown by itself and sometimes mixed with *birhi*, but the latter plan is not regarded as a desirable one, as the mixture fetches a smaller price than when the crops are sown and harvested separately.

Mode of cultivation.—When grown on uplands, especially if the soil be dry, from three to six ploughings and harrowings are given, according to the nature of the land, in the month of Aswin. Low *khal* lands, which are generally moist, receive but one harrowing before the seed is sown. The quantity of seed broadcasted per *mán* of land is five Cuttack seers. The *mahi* or harrow always follows the sowing, so as to cover the seed thoroughly. The seeds germinate in five or six days, and the plants flower after two months, when they are about a foot in height. Before the flowering season, the land has to be well weeded, ten to fifteen men being ordinarily employed for the work. The necessity of this operation is evident in the following proverb current among the rayaits:—

"Birhi hoi ghasá
Kulthi hoi chása,"

i.e., *birhi* will grow even when grass or other weeds are found in the field; but *kulthi* requires thorough cultivation and clearance of all weeds.

Harvesting.—The crop is ready for harvesting in Magh, the operation being performed by the hand. The plants are plucked off, then dried in the sun for two or three days and threshed by the *bengula*, and finally winnowed with the *kula* or winnowing basket.

Outturn.—The yield per acre of land is about three-and-a-half maunds. The price of one maund varies from twelve annas to one rupee.

Diseases, pests, &c.—(*a*) *Paschim* winds are believed by the raiyats to diminish the size of the seeds.

(*b*) Rain in November during the flowering season materially injures the crop. A good hot sun is required to bring the seeds to maturity, and cloudy weather at this time, therefore, is always regarded as prejudicial to the outturn.

(*c*) Rainy and cloudy days in November bring with them different kinds of insects, such as the *kalamundi* and *dhoboli*, which destroy the seeds before they become ripe, and destroy the crops. The former of these sometimes attack the crop just as the plants have developed one or two leaves, in which case there is always a total failure.

14.—*Chana* (*Khesari*—*Lathyrus sativus*).

Varieties:—Two varieties are generally grown in this district, known locally as the *bara chana*, having round seeds and red flowers, and the *khura chana*, having flattish seeds and purple flowers.

Soil and rotation.—The crop is generally sown by the riverside, flourishing well on a soil containing alluvium. It also grows in slightly clayey soils. In rotation it generally comes after *biali dhan.*

Mode of cultivation, &c.—In the month of Aswin, *i.e.*, after the *biali* dhan has been harvested, the land is given six ploughings and well levelled and pulverized with the harrow. The seed is then broadcasted either by itself or mixed with mustard-seed in the proportion of one seer of *chana* to quarter of a seer of mustard. Immediately after sowing, another harrowing is given to cover the seed. After six days the plants begin to make their appearance. The flowering season commences in Pous.

Harvesting.—The crop is harvested in the month of Falgun, when thoroughly dry, and threshed in the usual way. When mustard is sown with *chana*, the two crops are harvested and threshed together, and the seed subsequently separated by the winnowing basket. The mustard seed, being small, falls through the holes of the basket, while *chana* seed is left behind.

Diseases and pests.—(*a*) *Hantur poka*, a white insect as large as a paddy seed, having a black head, attacks the crop if it rains in the month of Pous, *i.e.*, during the flowering season, destroying more than half the crop at times.

(*b*) Excessive rain in the month of Aghran is also very injurious.

15.—*Barguri* (*Bargura or Barbati*—*Vigna catjang*).

Extent of cultivation.—*Barguri* is grown only to a limited extent, occupying probably not more than one or two square miles of the total cultivated area.

Varieties.—There are two varieties grown, though not known by any special names, the one being cultivated as a garden crop for its vegetable pods, and the other raised in fields for the sake of its grain, which is used as a pulse.

Soil and rotation.—It is grown on high loamy lands, and in rotation generally follows *biali* and *mandia.*

Mode of cultivation, &c.—Much preparation is not required for this crop. In the month of Aswin the soil is given one ploughing and the seed broadcasted the next day, when the land is once more ploughed and harrowed. The field is then left untouched. The seeds germinate in five or six days, and the flowers and fruits make their appearance in the month of Aghran.

Harvesting.—In the month of Pous, when the crop has matured and become quite dry, the plants are plucked by the hand with their roots and brought home, where they are exposed for two days to the sun and then threshed by the *bengala* when the outturn is large, or beaten with bamboo sticks when the crop is poor.

The variety grown for vegetables begins to yield fruit in Aghran. That grown for the grain, as above stated, should be harvested, like *birhi*, when thoroughly mature ("Birhi, barguri pacha," *i.e.*, reap *birhi* and *barguri* when quite ripe).

Diseases and pests.—During the heavy fogs of Aghran, the *jau*, a small insect, attacks the plants and damages the crops.

16.—*Harar* (*Arhar—Cajanus Indicus*).

Varieties.—The two kinds of *arhar* in the district are (1) *pala* or *Chaitra arhar*, sown in Aswin and harvested in Chaitra, and (2) *deo* or *nali arhar*, *i.e.*, sown in Jaishti and harvested in Magh or Pous.

(1) *Chaitra arhar.*—*Soil.*—This crop is grown generally on a light loamy soil which has been used for the cultivation of upland paddy. The site is so selected that it may not be far from a river.

Rotation.—It follows *biali* paddy. *Birhi* and *kulthi* are often sown along with *arhar*, but cultivators are of opinion that the crop sown by itself gives much better results.

Mode of cultivation.—After the *biali* crop has been cut in the month of Bhaddra, bullocks are allowed to eat off the small standing stems. The land is left untouched until two or three days after the first showers of Aswin, when it is ploughed twice and harrowed, and then broadcasted either with *arhar* seed alone, or with *arhar* mixed with *birhi* and *kulthi* seed. The sowing season generally continues throughout the month, but seldom or never extends into the month of Kartik. Six or eight days after this the plants appear, the only operation necessary in the meantime being to weed the land thoroughly.

Harvesting.—The crop is reaped in Chaitra. Showers of rain during the flowering season affect the crop very materially, which is then fit for no other purpose than to be fed off by cattle.

Outturn.—The yield in a good year is about three maunds per acre. When sown with *birhi* or *kulthi*, the latter are removed in Pous, each yielding about 1½ maunds per acre, and *arhar*, which is reaped in Chaitra, then gives a crop of one or half a maund in favourable weather. In harvesting the plants are plucked off by the hand, brought to the homestead, and then threshed like paddy. The stalks are used for cattle or fuel, and the grain carried for sale to other villages on pack-bullocks.

Pests.—(*a*) A white insect often destroys the crop after any showers that may happen to fall in the month of February.

(*b*) A red insect makes its appearance in the month of Ashar.

(*c*) Rainy and cloudy weather in the month of February injuriously affects the crop.

(2) *Deo or Nali arhar.*—*Soil.*—This red variety of *arhar* is grown on elevated lands near the homestead, the land selected being of a stiff clayey nature. It is cultivated only on small plots of land of a few *gunts*, mostly for home consumption. It is seldom grown on the same piece of land in two successive years, as the roots which are left are so woody that ploughing is not easily done the first year. The ground is therefore often allowed to lie fallow for a year, and tilled the third year for the same crop.

Mode of cultivation.—The land is prepared in Baisakh and Jaishti, when it receives three or four ploughings and harrowings. The seed is sown at the end of Jaishti or the beginning of Ashar. After a few showers of rain, the plants spring up in eight days, when the land is sometimes ploughed, but generally hoed with a *kodali*. The flowering season commences at the end of Kartik or the beginning of Aghran, and within ten or fifteen days of this the grain begins to form, maturing at the end of Pous. About this time the plants have attained a height of five or six feet and are ready for cutting. Four men perform this operation, completing a *mán* in two days. About six inches of the stem are left on the ground, and the rest of the crop which is cut with the sickle, is taken home, dried and threshed with the hand against a wooden framework to separate the grain, which is disposed off in the same way as the Chaitra *arhar*, the stalks, as usual, being given to cows and used for cooking.

Outturn.—The yield per acre of this *arhar* crop is on the average four maunds.

Pests, &c.—This crop is subject to the same pests as the Chaitra variety, the white insect, noticed above, attacking the plants in Kartik. Rain during the flowering season is highly injurious.

17.—*Masuri* (*Masur—Ervum lens*).

Soil and rotation.—*Masuri* does better on a clayey than on a sandy soil, and in rotation follows *biali* and the early variety of *sarad* paddy.

Mode of cultivation.—After the paddy crop has been harvested the land receives three or four ploughings and is then sown with seed in the months of Kartik and Aghran.

Harvesting.—The crop is harvested in Falgun and Chaitra and threshed in the same way as other *rabi* crops.

Diseases, pests, &c.—Rainy and cloudy weather when the crop is about to reach maturity is injurious, as it makes it liable to the attacks of insects.

18.—*Büt* (*Gram—Cicer arietenum*).

Soil and rotation.—Gram requires a moderately heavy soil, and is thus generally found cultivated on clayey wheat lands. In rotation it usually follows the autumn paddy crop.

Mode of cultivation.—Much attention is not paid to the cultivation of the land for gram, five or six ploughings after the rainy season being found quite sufficient to render the land fit for sowing. The season for this latter operation commences in Kartik and extends throughout this month to the first and second week of Aghran.

Harvesting, &c.—No after treatment is necessary, the crop being ready for harvesting in Falgun and Chaitra, when it is plucked off with the hands, and threshed in the homestead in the same way as other *rabi* crops. The husks of the pods and the stems are given to cattle.

Diseases, pests, &c.—Gram is subject to the same pests as *masuri*.

19.—*Matar* (*Peas—Pisum sativum*).

Soil and rotation.—Peas grow well in a loose sandy soil after maize.

Mode of cultivation.—The maize crop having been removed by the end of Sravan, the land is dug twice or thrice with the *kuri* or spade in the month of Bhaddra, so that it might be benefited by the rain which falls throughout this month. In the beginning of Aswin the land is manured with cowdung at the rate of about 25 cartloads to an acre, and then laid out in ridges and furrows at intervals of a foot. The seed is then planted in with the hand singly at the bottom of these furrows. The field is now watered every evening, generally with well-water, until the plants make their appearance some six or eight days after sowing. The watering is continued for two months more at intervals of about six days. A fortnight after sowing, *kunchi* or bamboo twigs are fixed into the ground by the side of the plants to enable them to creep up instead of spreading out on the ground. The only operation now left is weeding, which is done once a month.

Harvesting.—The flowering season commences in Kartik, when the plants are about three feet in height, and the pods begin to form at the end of this month. During the next two months the crop is in fruit, and by the month of Magh the pods are quite dry and ready for harvesting. The threshing is done at the homestead with a piece of bamboo which is made to beat out the seed. The dry stalks are used either for fuel or are given to cows.

Pests injurious to cutting.—Rainy or cloudy weather when the crop is about to be harvested injures the outturn.

Fibres.

20.—*Nalita or Jhout* (*Jute—Corchorus capsularis*).

Extent of cultivation.—The cultivation of this fibre crop has been carried on in the district from time immemorial, but is said to be decreasing day by day owing to the diminution in the amount of silt deposited by rivers since the opening of the canals. Jute is to some extent an exhausting crop, and cultivators being without the means of replacing the silt by the liberal application of manure, view its cultivation with disfavour. In an official report submitted in 1873 by the Subdivisional Officer of Kendrapara, 323 *máns* were returned as the approximate amount of arable land under jute. The actual area, however, under cultivation was estimated at 278 *máns* only, the 50 *máns* of decrease in the actual area under cultivation being attributed to the opening of the canals. According to the forecast of special crops published by the Agricultural Department in May 1892, the area under jute for 1891-92 has been shown as 8 square miles, this being the acreage returned by the District Officer of Cuttack. Of these 3 square miles are in the Sadar subdivision, 3 square miles in the Kendrapara subdivision, and 2 square miles in the Jajpur subdivision. In Kendrapara the chief places where the crop is grown are Balubiri, Tikan, Asureswar, and Lakkhan. In Jajpur the cultivation, though spread over the subdivision, is very limited, and may be well extended in the eastern side of the subdivision, as with the port of Chandbali so close, an important trade would very soon spring up. The crop is generally now found cultivated along the banks of the creeks which intersect the country lying between the Mahanadi and Brahmani, and generally about the lower portions of the delta. Parganas Bargaon, Jhankur, and Tisania are also localities of the cultivation of the fibre.

Varieties.—The variety chiefly grown is the one with round pods (*Corchorus capsularis*). The species known as the *Corchorus olitorius* is also sometimes found.

Soil.—The alluvial lands of the district are calculated to give the best returns, but the cultivation is not confined to such lands alone. The crop is found growing on clayey lands in the homestead, as well as on the high upland loams where autumn paddy is generally raised. Waste land is not unfrequently brought under the cultivation of the crop. What is necessary for its successful cultivation is sufficient moisture without an excess of water. In spite of this, however, it is found growing in *khal* or low lands where water may accumulate to a depth of one or two feet, but the outturn of fibre in such lands is generally very unsatisfactory.

Rotation.—Jute is cultivated once a year, generally followed by *birhi*, *mung*, *kulthi*, and mustard.

Mode of cultivation.—Should there be some occasional showers in Magh and Falgun, advantage is taken of it to plough and prepare the land. If the rain be very heavy, the raiyats wait till the land gets slightly dry, when they take out their ploughs to begin the tillage operations. Some seven or eight ploughings are now given at intervals of 8 or 10 days, and the ladder (*mahi*) is used only when there are clods required to be thoroughly crushed. Manure is not needed, the raiyats say, on clayey lands, but on upland loams it is invariably applied in the form of cowdung. The seed is next broadcasted in the month of Baisakh. Both the plough and the *mahi* now follow, and nothing remains to be done till the seeds have germinated some four days after. Ten or fifteen days after the first appearance of the plants above ground, when they will have attained a height of some two inches, the *bida* is dragged over the land to loosen it. This is especially necessary on clayey soils, when rain and sunshine has a tendency to cake the land. The plants are thus given the opportunity of springing up, a process which is greatly facilitated when the night dew is considerable and rain just enough to enable the plants to absorb the necessary amount of moisture. The weeding is done about a month or a month and-a-half after the sowing. At this time, too, many of the raiyats regulate the distance of the plants, which has an important bearing on the outturn. Should they be too crowded, they are thinned very carefully, so that there may be an interval of some six or eight inches between the plants. Thick growth means weak and stunted plants, whereas the other extreme means a rank growth of the branches, entailing a loss in the jute outturn on account of a proportionate diminution in the height. The above is regarded as the most convenient time for thinning, but in many parts the operation is delayed till the plants are one to two feet in height When the plants are about three feet high, the lower leaves are all plucked off from the stem, eight or nine leaves alone being left untouched at the top. This is done to encourage and increase the growth of the trunk. The presence of a large number of leaves on the main stem would induce the growth of fresh shoots from all the intermodes, and this would naturally stunt the upward growth of the plants. In this case the string manufactured would suffer as regards efficiency of strength, and the quantity made from the fibre would also considerably diminish. The flowering season commences four months after the sowing, so that in the above case the flowers begin to bloom towards the end of Bhaddra. Should the sowing be delayed till Jaishti for want of rain, the plants would produce their flowers in the month of Aswin. The next operation is a very important one, and on the skill of the raiyat depends the quantity of jute produced. Just as the flowers produce fruit, or, as the raiyats say, have "half produced fruit," the crop should be cut, as when the harvesting is done at the time the fruits have begun to mature, the subsequent process of rotting in water is greatly retarded, the result being a deficiency in the outturn of the fibre. Three *gunts* of land may be done by four men in a day, the plan being to cut the plants with the *dao* or sickle on a level with the ground. They are then made into bundles and allowed to lie on the land for two days, when most of the leaves wither and fall off. Those that are still on the stem are plucked off by the hand on the third day, and at the same time the tops of the plants are cut off with the sickle. The bundles are put together in heaps, and these are then taken to be immersed in muddy, stagnant water. Two posts are erected on either side of the heap, to prevent its floating away, and on the heap are placed the tops of the plants which have been cut off, and over this all kinds of jungly leaves, and then a sufficient quantity of mud and earth to keep the heap down and facilitate its fermentation by excluding light and air. After ten or twelve days the raiyats begin examining the bundles to see if they have attained a whitish hue and have begun to rot, and how far the rotting has advanced, and then within another five or ten days commences the removal of the fibres. When allowed to remain in the water for a very long time, they assume a dusky hue instead of being fleecy white.

Fibre extraction.—By some, the stalks are beaten against a platform until the pith sticks within are removed. This mode is not to be recommended as the pith sticks get broken and mixed up with the fibre, which itself gets knotted, so that the whole fibre has to be repicked. By others, the fibre is extracted in the usual way, only that instead of being pulled out in the pond where the jute has been immersed it is generally extracted at the homestead after it has been removed from the pond. In some places I noticed that the tops of the stalks were cut off before being immersed into water. In immersing the plants, many raiyats insert them first of all perpendicularly into the water, so that the upper ends may lie out of water, the theory being that the lower thick ends being more developed than the upper thin ends, take a proportionately longer time to rot, and so require to be a day or two longer in water. Generally, after twenty-four hours they are weighted down horizontally. The fibre is then dried and tied into bundles weighing five, ten or fifteen seers, and carried to the market for sale. The dry pith of the plants serve for lighting purposes among the poorer classes during funeral ceremonies, and especially at the *Kali Puja* festival in the month of October.

Outturn.—The outturn per bigha ⅓rd of an acre is reported to vary from four to six maunds.

Cost of cultivation.—This varies in different parts of the district from Rs. 8 to Rs. 16 per bigha. An average of Rs. 12 has been returned officially as the cost of production per bigha, the details of which are as follow:—

	Rs.	A.	P.
Ploughing and sowing ...	1	10	0
Weeding	0	14	0
Cleaning	1	8	0
Cutting	2	0	0
Washing, &c.	1	8	0
Rent	4	8	0
Total ...	12	0	0

Diseases, pests, &c.—Floods and heavy rains just after the seed has been sown, or while the plants are still young and tender, are detrimental to the proper development of the crop. Drought at this stage also injuriously affects the outturn.

Improvement in jute cultivation.—The only suggestion that I can make is the improvement of the crop by the importation of good fresh seed from the jute-growing districts. The soil in many parts of the district is well suited to the growth of this crop, and if seed therefore could be distributed through the Collector, an impetus would be given which is likely to lead to the extension of the jute-growing area and to the exportation of the fibre, which at present is practically *nil.*

21.—*Chanpat* (*Sunn—Crotolaria juncea*).

Extent of cultivation.—The area under this crop, though never very extensive, has diminished considerably since the introduction of Bally paper into the district. Formerly the cultivator used to grow his crop for the manufacture of paper, but now he does it chiefly for his own use.

Soil.—The crop is grown generally on new land, as the seed does not germinate well in fields that have already been under cultivation. Stagnation of water tends to rot the plants, and hence as a rule high lands are chosen for the cultivation of the crop. A mixture both of sand and clay is considered most suitable.

Manuring.—Cowdung and house-refuse is laid in small heaps all over the field after the first ploughing, and immediately before the seed is sown, it is spread over the field with a *kodali.*

Mode of cultivation.—The land is ploughed in the month of Jaishti four times, and seed broadcasted soon after very thickly so as to cover the soil closely, as thin sowing produces bushy plants at the expense of the fibre. The harrow is then taken over the land to cover the seed as well as to break the clods, so that rain-water may readily drain away. The plants appear above ground on the fourth day, and begin to flower in the month of Sravan.

Harvesting.—The plants are left untouched till the harvesting period in Bhaddra, when they are plucked by the hand with the roots attached. The raiyats know that the crop is ready for harvesting by shaking the dry capsules, when the seeds within produce a ringing sound.

Extraction of fibre.—Channels are dug on the field ten feet in length, half a foot in breadth, and one foot in depth. A bundle of plants is taken and placed across the channel. The two ends are pressed by the feet and cut off with a sickle, the roots to a span in length, and the tops to a foot. The latter are kept for seed, and the roots used for fuel. Twenty bundles of the stalks thus prepared are tied in large bundles, and then taken to the nearest piece of water and there planted into the bed perpendicularly, so that the upper half of the stalks remain out of water. This is done in order that the thicker lower portions of the stem may rot as readily as the softer portions above. After two days, the bundles are removed and laid horizontally immersed in water. They are then covered with mud, and allowed to remain thus for five days. One or two stalks are now taken out of the heap and examined to see whether the bundles have rotted sufficiently for the extraction of fibre. When ready, handfuls are taken and dashed on the water, and the stalks are then made to stand exposed to the sun until quite dry. The pith sticks within are broken by the hand and removed for fuel, and the fibre bound in bundles and sold to *beparis* or used by the cultivator himself for making strings, canvas, or nets.

The smaller plants are useless for fibre, and are removed from the field for fuel.

Pests, unfavourable weather, &c.—(1) *Sambarna,* an insect which is found in *sunn* fields during the heavy rains of Aswin, attacks the capsule when approaching maturity, boring a hole through and eating up the seed within.

(2) Stormy weather in Sravan lays the crop low and injures it seriously.

22.—*Kapa* (*Cotton—Gossypium herbaceum*).

Extent of cultivation.—The area of land under the cultivation of cotton is said to be decreasing from two causes. The first factor at work in reducing the area has been, as in other parts of Bengal, the introduction of, and the growing demand for, English piece-goods and twist, which are being consequently largely imported, ousting the ordinary country cloth out of the market. The cultivation of the crop is said by the raiyats to have declined also since the construction of canals and distributaries. Land near such distributaries have been rendered, according to them, unfit to raise the crop from its liability to inundation and excessive moisture. Water finding its way through breaches in the distributaries soon flood their cotton fields, to the great detriment of the plants, which are either destroyed or so affected that the produce becomes inferior in quality and nominal in quantity. Apart from this, it seems likely that the raiyats, now that they can get canal water, find it easier and even more profitable to grow rice, which they therefore substitute for cotton, the money returns from the latter being at best but uncertain. The area at present under the crop, as given in the returns of the Agricultural statistics of Bengal, is 3,787 acres, while in the Physical statistics of the district for 1877-78 the area was estimated at 79,350 acres. These figures seem to point to the gradual complete abandonment of the cultivation of cotton. The best specimens seen by me, with the exception of those experimented on at Madhupur, were in the Kendrapara subdivision, where it is chiefly grown in the parganas of Aul, Kujang, Balubiri, Tikan, Asureswar, and Derabisi.

Varieties.—There are two varieties of cotton grown in the district, both raised from seed belonging to the same species. These are the *Haldya* and the *Acchua*. The first of these may be said to be indigenous, being found largely in the western hilly parts of the district. The second variety, which is grown on the plains, is raised partly from this seed, but chiefly from the same kind of seed brought from the still further mountainous tracts of the Gurjats in the west. In the plains, cotton is said to deteriorate, and hence the seed is almost always imported from the hills even by the poorest raiyats, being brought round for sale generally by petty dealers of the *Keot* caste.

Soil and rotation.—There is no regular rotation. High lands of a light character are considered suitable, as a stiff soil tends to accumulate water, which is injurious to the growth of the crop. The general practice is to grow the crop on a loam after the harvesting of the *biali* crop. *Birhi* generally follows cotton, but in some cases the land is allowed to lie fallow till the next *biali* crop. It is not grown on the same land two successive years, as it is said to exhaust the soil.

In turmeric fields advantage is taken of the furrows to put in cotton, but the outturn in such cases is very poor. *Baitakakharu* (pumpkin) is also grown in cotton fields, but it generally bears no fruit, its leaves being eaten as vegetable.

Preparation of cotton seed.—The seed as bought from the dealers is first dried in the sun for an hour or two. It is then put into a basket filled with water and rubbed with the hand, after which it is put into an earthen pot containing water. Here it is mixed with cowdung. Then the water is allowed to drain out and the seed re-introduced into small baskets, and again put out into the sun at about 5 P.M. till it gets sufficiently dry so that it does not moisten the hand on contact. It is again put into baskets, the mouths of which are closed with straw, and these baskets are placed by the fire-place all night. In the morning the seed is found to have sprouted.

(1) *Haldya cotton.—Mode of cultivation.*—In the month of Pous, the land is ploughed and harrowed at intervals of three or four days. Several ploughings and harrowings are given until the land is well pulverized. It is then spread over with cowdung, which is ploughed in four or five days previous to planting. The field is laid out in lines, and the seed sown in these lines with the hand in Magh. Some cultivators sow as early as Kartik. Rainfall at this time immediately after the sowing rots the seed. The plants appear in four days, and in fifteen days the land is hoed, when the plants attain a height of about four inches. Some rain is now required. When there is a scarcity, therefore, raiyats have to irrigate their fields. Four or five hoeings or even more follow, till the time of flowering and fruiting, which, when the seed is sown in Pous, will be in Chaitra, and when sown in Magh will be in Baisakh. Care is taken to fence or embank the fields at the time the plants are sown.

Harvesting.—Harvesting begins in Chaitra or Baisakh, and extends for about two months, as the pods cannot be collected simultaneously owing to their coming to maturity at different times.

(2) *Acchua cotton.*—This variety is generally sown in Jaishti, and is harvested in Aswin. The mode of cultivation is the same as that given above.

Outturn.—The outturn varies from 70 to 80 lbs. of cleaned cotton (*i.e.*, about a maund) per acre according to the quality of the land.

Diseases, pests, injurious weather, &c.—Before the capsules have burst a little rain is good, but after bursting rain damages the crop. Stormy weather at this time is very injurious. At the time of fruiting; the crop is sometimes attacked by a small white grub with a black head, which does considerable damage to the crop. The plants are also sometimes destroyed by another insect which eats into the roots of the young plants. Hoeing is found very effective in this case. The crop also suffers from excessive heat and abnormally dry weather. The leaves in this case become reddish in colour and eventually wither way.

Suggestions for improvement.—The cultivation of cotton threatens to die out altogether, due to causes discussed above, and it therefore becomes all-important to consider measures that may be taken to lead to its revival. The only suggestion I can offer is the introduction of improved varieties. One fresh variety, viz., the *Nankin* or *khaki* coloured cotton, has been tried experimentally by me in the Madhupur estate with good results. The outturn has proved satisfactory, and the cloth made from it by the local weavers has been pronounced to be stronger than that of local manufacture. The colour of the cloth is a distinct recommendation to the Uryas, who prefer it to their own white cloth, which gets dirtier sooner when used. Some of the raiyats of the estate have taken to its cultivation already, and it is hoped others may also follow their example. It seems to me that the line of country at the foot of the hills along the western frontier of the district would furnish good and convenient soil for experimenting with this new variety.

23.—*Dhaindicha* (*Dhaincha—Sesbania aculeata*).

Soil and rotation.—The soil suitable for cotton is also used for growing this crop. In fact *dhaincha* is generally found growing with cotton either forming a sort of a fencing for the cotton field, or sown in lines in the field itself at intervals of about 10 feet, with cotton plants in the intermediate spaces. When sown by itself, it is generally followed by paddy.

Mode of cultivation and harvesting.—The ploughing operation commences in Kartik or Aghran, and the land is ready after about ten ploughings to be sown with seed in the month of Magh. The plants appear in eight days. No special trouble is taken with the crop, which is left untouched and unmanured till the time of harvesting. When used for fuel, it is harvested in Ashar. The soil round the roots is dug with a *kankh*, and the plants then plucked off with the hand. They are then tied in a heap on a waste piece of land or in the homestead, to serve as fuel for the next four months. When intended for fibre, the crop is not cut till the month of Bhaddra. Like jute, the stalks are immersed in stagnant water for fifteen days, when the fibre is removed, dried, and used as string for ploughs, for tying bullocks, for mats, and for other similar purposes.

Oil-seeds.

24.—*Gaba or Jara* (*Castor—Ricinus communis*).

Soil and rotation.—The crop is generally grown on lands where silt has been deposited, and may be seen all along the banks of rivers, where it forms the only crop of the year. It is, however, taken as a second crop on loamy lands. In stiff soils the plants become stunted and yield very little fruit.

Mode of cultivation and harvesting.—The seed is generally sown in the month of Kartik, but some cultivators sow as early as Ashar. In either case the land is ploughed and harrowed several times until the soil is thoroughly pulverized. Cowdung manure is then applied, and the field is ready for being sown. Lines being drawn at regular intervals up and down the field, one or two seeds are taken and placed by the hand in holes made in these lines at distances of five or six inches from each other. The field is now watered for the next two or three days from a *kalsi* with canal, river or well water. The more forward plants appear in 14 or 15 days, but others do not sprout till a month. As soon as they make their appearance, the soil is hoed with a *kodali*, this operation being carried on till the time of harvesting, with the object of getting rid of weeds. Some cultivators follow the practice of heaping up earth on one side of the plants in order to bend them slightly, as they are of opinion that when thus treated they gave a better outturn than when allowed to shoot up straight. When the seed is sown in Kartik, the plants begin to flower in Falgun and Chaitra, and the seed becomes ready for removal in Baisakh; when sown early, the crop may be harvested in the month of Pous. A basket is held with one hand under the elbow, and with the other the fruit is plucked off and allowed to lie for five or six days. When there is no rain the heap is allowed to lie out in the open air, but when showers are expected, it is taken into the house to prevent the seed from rotting. On the sixth or seventh day the heap is levelled and the seeds thus exposed to the sun to be dried for two or three days, after which they are put in the *dhenki* to have the husks removed. The *manji* within is then sold to the *teli* or oilman, and the outer skin, known as *chopa* or *kori*, is either thrown away or used for fuel. The stalks of the plants are used as fuel after being dried. The leaves are sometimes given to cattle. Some cultivators, before putting out their fruit to dry, moisten them well with cowdung and water, and then remove the outer shells simply by pressing with the hand.

Outturn.—One acre of land yields from 2 to 4 maunds of seed.

Diseases, insect pests, &c.—(*a*) *Kankuturi.*—This is a small black insect about quarter of an inch in length. It attacks the root of the young plants at the sprouting season, and kills them entirely.

(*b*) *Palagana* is a black insect found also on the mustard plant, which attacks the leaves and stems in the month of Pous. The crop, though not completely destroyed, suffers very much, the outturn being considerably reduced. No remedies are used. Besides these insect pests, rain during the flowering season is found very injurious to the crop.

25.—*Pisi or Tisi* (*Linseed—Linum Usitatissimum*).

Soil.—Linseed is grown on soils which have been used for the cultivation of autumn rice, *i.e.*, those of a light and loamy character. It is sometimes sown by itself, but more generally with *kulthi.* In the northern part of the district, it is cultivated along with *dhaniya* (coriander seed) and wheat, and is also found in castor plots.

Mode of cultivation.—The land is ploughed in the month of Aghran. Four ploughings and harrowings are given at this time, and eight days after the seed sown at the rate of about six to nine Cuttack seers per acre of land. The ladder or *mahi* follows the sowing. Manure in the shape of cowdung is applied either at this time or when the land is receiving its ploughings. The seed germinates in four or five days. In the month of Magh three or four waterings are given, and the weeds cleared when convenient. The flowering season commences in the month of Chaitra, the crop reaching maturity at the end of this month.

Harvesting.—The plants are plucked by the hand and carried to the homestead, where they are spread out in a heap and dried for four days. The threshing is done by bullocks or by treading with the feet. The seed is sold to *telis* for the manufacture of oil at the rate of 20 to 25 seers per rupee, and the stalks are used for fuel.

Diseases, pests, &c.—Foggy and stormy weather in the month of Magh is very injurious to the crop, as it generally brings with it a small white insect which attacks and destroys the growing plant.

26.—*Khasa or Rasi* (*Til—Sesamum Orientale*).

Varieties.—There are two varieties, viz., the white and black, the first of which yields a *bhadoi* crop, and the second a winter or *maghi* crop.

Soil.—Waste land of a more or less clayey nature is considered mots suitable for the *bhadoi* variety.

Mode of cultivation.—Three ploughings are given to the land in the month of Ashar. The seed is next broadcasted and the land harrowed. Germination takes place in four or five days, and in a week or so the plants will be found bearing two or three leaves. The flowering season commences in Bhaddra. The field is left untouched till the harvesting season.

Harvesting.—In the month of Aghran, when the fruit becomes dry, the plants are cut with the sickle and brought home tied in bundles. The bundles are exposed to the sun, to be further dried till the crop is ready to be threshed. After the threshing (generally with a bamboo) the produce is winnowed with the ordinary winnowing basket.

Diseases and pests, &c.—Misty weather during the flowering season damages the crop very seriously. The *maghi* variety is cultivated in the same way as the *bhadoi* variety. It is sown in Aswin, flowers in Aghran, and is harvested in Magh or Falgun.

27.—*Sarisha* (*Mustard—Brassica Campestris*).

Varieties.—The two principal varieties grown in Cuttack are (1) the *nali*, with red seed, harvested in Magh (sometimes called *Maghi Sarisha*); and (2) the *raya*, with yellowish white seed, also harvested in *Magh*.

Soil.—Mustard is cultivated principally on alluvial lands, and to a certain extent on loamy soils further removed from the riverside. On clayey soils it never flourishes, and has been found to fail whenever its cultivation has been attempted on homestead lands, which are generally more or less clayey in their composition.

Rotation.—The mustard crop generally comes after *biali*.

Mode of cultivation.—This crop requires great care and trouble. After the *biali* crop has been cut in Bhaddra, and when the ground has become rather dry in Aswin, the plough is taken over the land some ten or twelve times, and well harrowed until it is thoroughly pulverized. The seed is next broadcasted in Kartik at the rate of five or six seers per acre of land. The plough precedes, a man follows with the basket of seed, sowing it in the furrows made by the plough, and the harrow comes after to cover the seed. The young plants make their appearance in four or five days. Nothing is done to the land before this stage, but all the weeds that spring up after the crop has attained a height of half a foot are carefully removed by the hand or *dao.* This operation continues for 10 or 12 days. A moderate quantity of rain is required after the plants have sprung up to give them a good start. Should there be any heavy showers of rain during the flowering season in the month of Pous, the whole crop fails, as the flowers easily fall off, and the plants become subject to the attack of insect pests. A good dry season at this time soon brings the crop to maturity, when it becomes ready for being gathered in.

Harvesting.—Care has to be taken that this operation is done as soon as the crops begin to show signs of maturity, as any delay now entails a large loss in the quantity of seed, which easily falls off to the ground when the plants are being removed. The harvested crop is heaped up on a clean plot of ground and allowed to dry for three or four days, when it is crushed and winnowed in the ordinary fashion. The seed is then stored or sold to *telis* for the manufacture of oil.

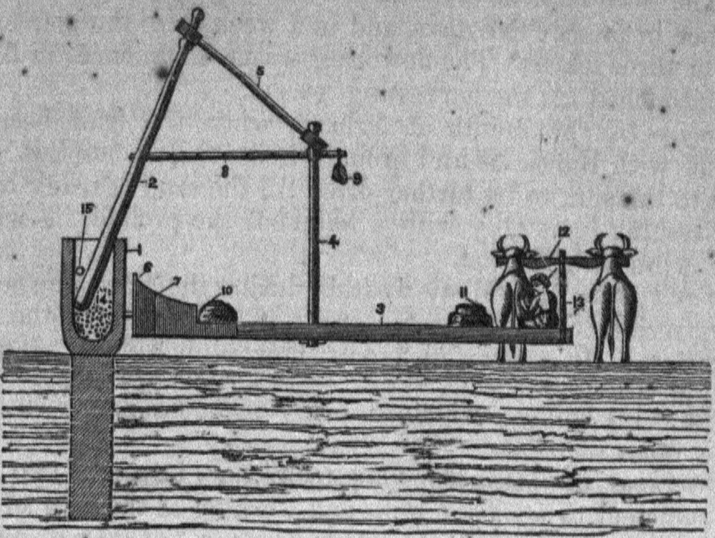
Outturn.—The yield per acre varies from 3 to 6 maunds per acre.

Diseases, pests, &c. (1) *Akasdooi.*—This is a small white insect which attacks the seed while still unripe in the month of Pous.

(2) *Kalamundi.*—This insect also attacks the young plants when the rainfall is excessive.

Suggestions for improvement.—The seed of the mustard plant in Cuttack is very small and yields but a light crop. Some new seed like the large mustard of the Sonthal Parganas may be introduced into the district with advantage.

Manufacture of oil: Mustard oil.—This oil is manufactured almost throughout the whole year by people of the *Teli* caste in a mill known locally as the *ghani*, which is worked by bullocks driven by men and boys, women generally engaging in the work of cleaning the seed. The subjoined woodcut shows the different parts of the mill:—



The names by which they are known locally, with particulars about the cost, materials and dimensions, are given in the following table:—

No.	Urya names of the different parts of the mill.	Materials of which they are made.	Cost.			Dimensions, weight, &c.
			Rs.	A.	P.	
1	Gandi	Bahara wood	6	0	0	Part under ground = 6 feet. Height above ground = 4 feet. Circumference = 7 feet.
2	Musul	Kusuma wood	2	0	0	Height 10 to 12 feet.
3	Kathuri	Sálua wood	0	8	0	Length 10 to 13 ,,
4	Manikhumba	Sunduri wood	0	1	6	Height 6 to 7 ,,
5	Dhenka or bankia	Ditto	0	1	6	Length 6 to 7 ,,
6	Kara kathuri	Ditto	0	0	6	Do. 2½ feet.
7	Ghossa	Ditto	0	0	6	Do. across 1½ feet.
8	Rianthi	Bamboo	0	0	6	Do. 7 feet.
9	Dhiramunda	Sálua wood	These cost nothing, as they have not to be purchased.			Weight 2 seers, hanging by a string.
10	Weight	Stone				Weight 12 seers.
11	Do.	Do.				Do. 30 ,,
12	Jiwali	Sunduri wood	0	2	0	Length across 5 feet.
13	Oradango	Bamboo	0	0	3	Do. 5 feet.

Mode of preparation.—The seed, if raw, is first dried in the sun for two or four days. It is then cleaned and introduced into the *gandi*. A man sits at the further end of the *kathuri* to weight it, as well as to drive the bullocks, which move in a circle round the *dandi* with the *kathuri* as the radius.

The *musul* is inserted in the *gandi* (mortar), and acts as a pestle to grind and crush the seed. Its movement round its axis is effected by means of levers. The *dhenka* and *manikhumba* attached to the *kathuri* are themselves moveable round the *gandi*. The *rianthi* is attached to the *musul* and *manikhumba*. Sometimes its point, instead of being attached high up on the *musul*, is inserted into the seed, when it does the work of stirring up the seed and cake. No. 15 in the diagram represents a hole which is made in the cake No. 14 by means of a solid iron implement known as a *sabal*. A piece of bamboo with a rag attached to one end, and known in the Urya language as the *talikhora*, is inserted into that hole from time to time to absorb the oil, which is extracted by squeezing the rag, the contents being received in a wooden bowl styled the *arra*. In this respect the mills in Orissa differ from those in Bengal, where the oil runs out of a hole in the *gandi* on a principle similar to that of the ordinary sugarcane-crusher.

The outturn.—The outturn consists of two articles of trade, viz., oil and cake. With regard to the amount obtained, very much depends on the quality of the seed when introduced into the mill. As a rule, 10 seers of good seed will produce about 2½ seers of oil, which in the Cuttack market may be sold at 2 to 3 seers per rupee, fluctuating with the annual outturn of the crop.

The cake or *piria* left in the mill is collected for four or six months in the homestead, and when forming a large heap, is put into pits and preserved there till a purchaser is found. These pits are about 6 feet in depth and of a circumference of about 12 feet, and are covered over on the top with mud and straw. The rate at which the cake is sold to *beparis* varies from six annas to a rupee per maund, the latter being the price obtainable at the Sadar station. The amount obtained from 10 seers of seed would be about 3 seers.

Adulteration.—In Kujang particularly, and in some other parts of the district, very good and unadulterated oil may be obtained, but in the Cuttack market, as well as in the generality of local *hâts* and marts, mustard-oil is largely adulterated. The better class of oilmen use a grass known as *banaghas*, for the purpose of clarifying the oil, which in many instances may well compare with the best oil of other districts.

Cost of working the machine.—One man, one boy and two bullocks are found quite sufficient to work the mill, and working at the rate of six hours a day, the daily expenditure on the average does not exceed four annas.

Castor oil.—The fruit of the castor plant, after being plucked off, is removed to the homestead, where in a heap it is allowed to lie for five or six days, the precaution being taken to remove it within, in case of a fall of rain. On the 6th day the heap is levelled and the seeds exposed to the sun to dry. This is done for three days, when they are next put into the *dhenki* to remove the shells, which are either thrown away or used for fuel. What is now left is put into an oil-mill and crushed in the same way as mustard. Sometimes, however, the plan is followed of boiling the seeds slightly and then powdering them in a *dhenki*. When well mixed with water, the powder is boiled a second time in an earthen pot. The oil produced in this fashion is not as clean as that obtained in the mill, having generally a dull reddish tint.

Tisi oil and khasa oil.—These are made in exactly the same way as mustard-oil.

Miscellaneous crops.

28.—*Akhu* (*Sugarcane—Saccharatum officinarum*).

Extent of cultivation.—The cultivation of this important and profitable crop is very limited in this district. Though grown in small patches all over, the actual area under cultivation is very insignificant. In the year 1883 it was estimated that about 2,000 acres only were sown with sugarcane and distributed as follows:—

		Acres.
Sadar subdivision	...	1,100
Kendrapara	...	600
Jajpur	...	300

From the latest returns supplied by the Collector to the Director of Agriculture, Bengal, it appears, however, that the cultivation of this crop has of late years been increasing, the estimated area being returned as 9·8 square miles, *i.e.*, 6,272 acres, or more than thrice the area cultivated seven years ago. It still, however, bears but a very insignificant proportion to the total area under cultivation, which is estimated at about 1,970 square miles. The reason of this is that the crop requires a great amount of care in its cultivation and entails also a large outlay, to neither of which is the Urya raiyat equal. The sugarcane-growers of Cuttack are generally the most advanced and skilful cultivators of the district, a fact which was brought home to me by the practical monopoly of this cultivation in Banki by the Atguriah Brahmans of that estate, and its monopoly elsewhere generally by the well-to-do *khandaits*. The largest amount is grown in the Sadar subdivision, including Banki. In Jajpur, its cultivation may be observed near the western hills in Madhupur and Bolarampur, as well as in other parts of the subdivision, and in Kendrapara it is found chiefly grown in parganas Kujang, Balubiri, Tikân, and Asureswar.

In all these parts, although there is much land suitable for growing the cane, the raiyats prefer to grow paddy and *rabi* crops. It is only in those villages which afford very great facilities for irrigation that sugarcane is cultivated to any great extent.

Varieties.—Although there are some six varieties produced in different parts of the district, the two which are cultivated most generally are the *kantari* and *kali* (or *kajala*).

The former of these is a yellowish cane, juicy and rich in sugar, resembling somewhat the *samshara* variety of the Burdwan district. The average height of such canes varies from 6 to 8 feet, and the circumference is about 2 inches. *Kali* is an inferior thinner cane, and, as the name would indicate, of a dark or purple colour. It is an earlier variety than the *kantari.*

The other varieties grown in the district are the *rupa* (silver-coloured whitish-yellow), *gora* (dark yellow), *pankoi* (purple), and the *Bombay.*

The first of these seems to me to be the same as the *kantari* variety, which in course of time on account of inferior cultivation has gradually degenerated into a smaller cane. The cultivation of *gora* and *pankoi* may be said to be quite extinct now. The Bombay variety is grown from seed originally brought from the Deccan, and occupies but a few fields throughout the district. It is much thicker than any of the indigenous varieties, but the raiyats prefer the taste of the *kantari* variety, and consider it better for the manufacture of *gur.*

Three other varieties may here be noticed, viz., the *samshara,* the *red Saharanpur,* and the *khari* introduced by me in the Madhupur ward's estate and in the Government estate of Banki.

Rotation.—Sugarcane is considered by the raiyats a very exhausting crop, and is consequently grown on the same field only after an interval of three or four years. When grown on *sarad* lands, the highest of such lands is selected for the purpose.

In *biali* fields the practice is to take a crop of *birhi* after the autumn paddy, and then to prepare the land for sugarcane.

Soil.—The cultivator selects those fields which are situated close to river banks, or to other sources of supply of water, so that every facility may be provided for irrigation. The site chosen is generally high, so that there may be no stagnant water, which is always injurious to the crop. Both clayey and loamy lands are used for growing the crop. With an average rainfall, the former or *matal soil* gives a good produce, but in a season of heavy rain the cane flourishes better on the lighter *dorosha* loams.

Tillage and manuring.—The first ploughing is given to the land in the month of Magh. In a year of deficient rain, the land is first irrigated and then ploughed. The raiyats do not seem to know that sugarcane requires deep cultivation. They are quite satisfied with the ordinary ploughing, three or four inches deep, but at the same time they believe in thoroughly pulverizing the land, and to this end, plough and harrow it about ten or twelve times at the outset. During these ploughings, cowdung manure is spread over the land and mixed with the soil. The next operation is that of watering the land. The ladder is run over the land on the day following the watering to break all clods. Some four or five ploughings and one harrowing then follow. The land is next laid in parallel-ridges, which are made with the plough, the soil being earthed up from either side. The height of the ridges is about 5 inches, the breadth 8 to 12 inches, and the space between the ridges 10 inches. The cuttings are planted in these furrows in the month of Falgun, at distances 6 to 10 inches apart. They are laid flat, and earth placed over them to a height of about two inches, the earth being taken from the ridges. Cowdung manure is applied at the time of planting by a few raiyats. In some places, the practice is to water the plants the very next day, but many raiyats do not water them till the third day after planting, the idea being that such a method facilitates germination. Some five or six waterings are now given at intervals of four to five days. After this the earth on either side of the cuttings is removed either with an iron *kuri* or with a small piece of ordinary bamboo. Then with the fingers, the earth round the little sprouts is removed, and the cuttings thus exposed to the sun and air for a couple of days. The next plan is to heap up the earth again along the cuttings, and to give another watering. The ridges are now dug with the *kodali,* the weeds extracted, and the land pulverized and loosened. The soil being thus loosened round the cuttings, the roots push themselves out into the soil, and the growth of the plants is thus facilitated. The land next receives two more waterings, and then is dug again, and is watered twice again and dug. After the weeding, some lands receive sixteen waterings and eight diggings, whereas in other places only half as many waterings and diggings are given. When the plants have attained a height of about 3 feet, manure is placed near their roots and the plough is taken through the middle of the ridges, so that the soil is earthed up over the manure and the roots.

When cake is used (castor, mustard, or linseed) it is first well ground to a powder in a *dhenki,* and then the powder applied to the roots at the rate of 8 or 9 maunds per acre of land. Cowdung is applied above the cake, and then earth ridged over this. The crop is now left untouched, unless the heat be very great and rain very scarce. In this case should the plants show signs of withering, a watering is given. When the canes make their appearance the dry leaves of the plants are tied round them, with the idea of protecting them from the sun's rays. This is believed to induce more vigorous growth, and to make the canes thicker. This plan also protects the canes from jackals and pigs. The process of thus tying dry leaves round single canes is called *kharia.* Two, four, or eight days after this, groups of 10, 15 or 20 canes are tied round in the same way, the operation being known as *pahali.* Four or five days are allowed to pass, and when fresh leaves begin to appear, three or four are left untouched, and the next three or four used for tying. This same process is repeated from time to time, and ultimately four or five of the above groups are tied together in one mass. Thus light and air are freely admitted through all the plants, which are further mutually supported by being bound together.

Harvesting.—The harvesting of the crop begins as early as Aghran and continues up to the month of Falgun. It is, however, generally in the month of Magh that the *gur-making* operations are in full swing. The *kali* variety generally comes to maturity in Aghran. The raiyat having once set up his shed and crushing mill can ill afford to wait for the *kantali* variety, which ripens in Falgun, so he adopts the plan of crushing the mature and immature canes together, a plan which takes both from the quality and quantity of the *gur* manufactured from the cane. The richer cultivators, however, follow the plan of setting up their mills a second time in Falgun.

Manufacture of gur.—Extraction of the juice.—The mechanical contrivances made use of for this purpose are—

(1) *The kolhua or gandi.*

(2) *The khai.*

(3) The improved *khai* made on the principle of the Bihia cane mills.

Besides the above, two or three Bihia mills are used in Banki and Madhupur, the latter estate having been supplied by the Agricultural Department with a three-rollered mill containing the latest improvements made by Messrs. Thomson and Mylne.

The kolhua or gandi.—This machine is very similar to a common oil mill, the only difference being that there is a small hole bored through the mortar at the bottom, to which a tube is attached to allow the juice of the crushed canes to flow down into earthen pans placed below on the ground. The canes are cut into small pieces about 6 inches in length, and then a basketful at a time is put in for crushing. Three men generally engage in the work. One of them stands by the side of the mortar, and with a wooden hammer pushes in the cuttings, turning them up and down to subject them equally to the crushing action of the pestle. The second man drives the bullocks, and the third feeds the mill with cuttings and carries away the extracted juice to the shed to be used for boiling. This is the most primitive of the three modes of crushing prevalent in the district, though it is the one most in vogue. A large proportion of the juice is left unextracted according to this method, and what is extracted is generally full of dust and dirt.

The khai is similar to the *kappa khai* or cotton seed mill. It consists of two small horizontal rollers placed one above the other and may be worked by the hand. When used, however, for crushing whole canes, the machine is driven by bullocks, the canes being twice passed through the rollers. An improvement on this is the mill with vertical cylindrical rollers very much on the same principle as the Bihia mill. The extraction of the juice by this machine is much more satisfactory than by the *kolhua*. Unfortunately it is rather rare in Cuttack, being more largely used in the Gurjats, whence they are sometimes brought into the district.

Boiling of the juice and preparation of gur.— A small shed, called the *sal* or *salighara*, is erected close to the plantation where the mill is worked. A large circular *chula* or furnace is dug in the ground about 4 feet deep, stretching out into a shallower furnace with a depth of only about 2 feet. The top of the furnace contains four or six small holes in a line to hold the small boiling pans and one large hole for the large storepan. On the other side of this pan are three earthen pots or *handis* called *pagulis* to receive the *gur* when ready.

The expressed juice, which is called *darua*, is introduced into all the pots, the small ones being generally half filled, while the large one is filled nearly full to the brim. The latter being subjected to greater heat, its juice begins to boil first, and when it gradually thickens, it is taken out by a ladle by the *gur* manufacturer, who sits by it, and is poured equally into the three *pagulis*. When the large pan is emptied, it is refilled from the little pans, which in their turn are again filled with fresh juice. The *gur* is then taken from the *pagulis* and filled into jars. Sometimes the boiled juice is poured into small conical shaped earthen pots called *banáhs*.

Lime water (made by dissolving the ordinary betel *chunam* with water) is often added to refine the *gur*. Instead of lime, ashes are sometimes used, which are prepared by the washerman caste alone from the wood of the *arka* and *asan* and some other trees.

Preparation of coarse sugar.—The conversion of the *gur* into sugar is carried on by the *Guryas*. The process is a very simple one. The *gur* being placed in a strong piece of cloth, is well pressed to drain out the molasses. Water and milk are then added and the mixture boiled and skimmed. When of a sufficiently solid consistency, it is stored in an earthen pot which is covered with a lid, and well besmeared with cowdung. After being kept in this fashion for four or five days, the pot is broken, the sugar within being by this time ready for use. It is dark in colour and of a very coarse quality, and sells at about Rs. 5-8 per maund, while the average rate for *gur* is Rs. 4 per maund of 82⅐ lbs.

Yield.—The estimated outturn per acre of *gur* varies from 20 to 50 maunds, which, calculated at Rs. 4 the maund, would represent a money value of Rs. 80 to Rs. 200 per acre.

Cost.—The cost of cultivation and of the manufacture of the *gur* varies from Rs. 80 to Rs. 160 per acre.

Preservation of cuttings.—Some cultivators follow the practice of cutting off the tops from the canes while on the ground, stripping off their leaves and then planting them immediately. For this purpose, a small plot of standing sugar-cane is always reserved from the previous season's crop. Others again prepare their cuttings three and four days previous to planting. In this case, the plants intended to be used for sowing are left untouched till the month of Jaishti, when, being cut into small lengths, each containing two knots, they are thrown pell mell into a small-pit and covered with straw and mud. The pit is then flushed with water and the cutting allowed to remain in this condition for three or four days till they are removed for planting. A more elaborate system is prevalent in some parts of the district of putting the cuttings in holes with layers of cowdung and straw on them. Other layers of cuttings are placed over the cowdung and straw, and then similarly covered with the same materials. As is usual in other parts of Bengal, the tops of the canes are also set apart during the time of harvesting for the following year's sowings.

Diseases and pests, &c.—The crop is subject to several pests, among which are the following:—

(1) *Nalipoka.*—This was identified by Mr. E. C. Cotes of the Museum as the *Diatræa saccharalis*. It is a caterpillar about three-fourths of an inch in length with a light greenish body and a dark reddish or blackish head. It eats into the stems of the plants when they are still young, and disappears generally with the fall of heavy showers of rain.

(2) *Kalipoka.*—This is a black insect of the size of a grain of paddy. It does not do much damage to the crops, being found attacking the leaves alone generally in the month of Bhaddra.

(3) *Jawa.*—This is a small insect which also attacks the leaves. The quantity of the outturn is not much affected by its attacks, but *gur* made from plants infested by these insects is said to be of a poor quality.

(4) *Rontha.*—This is a small white insect resembling a grain of rice which is found eating up the tender leaves of the plants in the month of Baisakh. Like the *nalipoka*, it disappears with heavy rain.

(5) *Ouipoka.*—This is the common white ant, which generally makes its appearance in the month of Chaitra, and often proves very destructive. The raiyats generally flood their fields to rid their canes of these pests.

In addition to the above, hogs, jackals and bears do a great deal of damage to the crop, especially when they happen to be in the vicinity of a jungle.

Suggestions for improvement.—The supply of sugar from local sources is far below the demand, and the article has to be largely imported in consequence from Sambalpur and other places. Under such circumstances, it would seem that the Uryas would be induced to extend the area of cane cultivation, as well as try and improve on their methods of cultivation and on their manufacture of *gur*, which is at present of very inferior quality. While a slow progress has been made in the extension of the area under this crop, the quality of *gur* and coarse sugar, I learn from various sources, is just the same now, or even worse than it was ten or fifteen years ago. It becomes very necessary to examine, therefore, into the direction in which improvement may be effected. To begin with, although the *kantali* variety is good enough, the *kali* variety is much below the mark in the quantity of its juice and saccharine matter. It may therefore be well replaced by some other new varieties. Then, again, in many parts of the district, the benefits of deep cultivation for this crop are not known. The supply of manure in most cases is altogether inadequate, some being content with a sprinkling of their homestead refuse. Improvement may be effected if the benefits of deep cultivation and liberal manuring be practically demonstrated to the raiyats in Wards' and Government estates with varieties imported from other parts of Bengal. As already mentioned, something has been done in this way in the Madhupur estate and in Banki, where the sugarcane experiments carried on under the supervision of this Department have proved a success. A great change is also needed in the extraction of juice and in the manufacture of *gur*. The Bihia mills have given satisfaction in Madhupur, and may well take the place of the ordinary *kolhuas*, and the evaporating pan, which has been found useful in Madhupur, may also be introduced in different parts of the district with advantage.

29.—*Pana* (*Betel—Piper betel*).

Extent of cultivation.—The betel-leaf is not grown to any very great extent in Cuttack. Barkud, which is situated almost in the heart of a forest in the Kendrapara subdivision, at a distance of a few miles from False Point Lighthouse, is by far the most important place in the district where the betel-leaf is grown. Its cultivation, which is here carried on by 12 families, is generally confined to men of the *Barui* caste, who coming originally from Bengal have now settled down as permanent residents of the Cuttack district. The largest portion of the district, especially the marts of the Kendrapara subdivision, are supplied with betel-leaf from this station. Besides Barkud, there are two other villages in the Kujang estate where this cultivation is carried on, viz., Noagong, where there are 10 houses, the owners of which have only lately taken to this profession, and Nemodia, consisting only of one family which has migrated there from Barkud. At this latter place, however, the cultivation of the leaf is carried on along with that of pumpkin and other vegetables, but as the latter are a great attraction to wild pigs, which do considerable damage to the *pan* crop by breaking off the creepers, the practice of growing them in *pan* lands has been diminishing. There are *pan borojes* or plantations also in the Jajpur subdivision, notably at Ijapur, as well as in other parts of the district, but they are by no means as well known as the *borojes* of Barkud, which are most zealously guarded from all intrusion, as the delicate leaves, according to the belief of the growers, can ill bear any noise or disturbance (*gola mal sohi na para*). Admission into the plantation was accorded me as a favour, where my peon's unholy tread was deemed undesirable. Under the sheds, the leaves may be plucked and smelt, but not eaten. Women may not bathe in the tanks and ponds from which the creepers are irrigated.

Varieties.—The best variety grown in the Kujang estate is the *kapuri* or *kapurkanthi*, which has a strong scent like that of camphor. The leaves are not sold as a rule, but used as sacred offerings in the worship of the gods and reserved for distinguished visitors, being grown for these purposes on a very small extent of land. Its cultivation, however, is being discontinued on account of the many diseases to which it is subject. The other varieties grown in these parts are the *bengala*, which is sold at the rate of 1,200 leaves per rupee, and the *chachi*, a *pan*, which is considered as cooling and fetches a rupee for 800 leaves. The latter of these two varieties is also grown in the Jajpur subdivision, where the second variety that is cultivated is known locally as *sadaya*, which is further divided into the *mahata* and *rashi* sub-varieties, names given only to distinguish the size of the leaf.

Soil.—The land which is considered most suitable is one of a clayey nature, situated on a high level where water will not stagnate. A soil, on the other hand, that is too loose is not good. *Pan* cultivation is always commenced on virgin soil. To prepare the land for a new plantation, the jungle is first cut down and burnt, the ground dug very deep with the *kodali*, and the ashes well mixed by constantly turning the soil inside out to a depth of about 3 feet. The land thus prepared is allowed to lie for the first year and sown the second year, so that the first crop is not obtained till the third year. The same land when once ready may be used for 10 or more years, but if abandoned it is not used again.

Mode of cultivation.—After the jungle has been cut down, the first operation is to fence the land and cover it with a bamboo framework, which is thatched with *inkar*, a reed which is grown on waste land. The fencing, which is about 6 feet in height, is sometimes made from bamboo and *nara ghas*, a grass which is very common in jungles, where it attains a height of 8, 10 or 12 feet. When thus hedged in, the land is well dug, all holes filled up, and the whole area well pulverized and levelled with the hand. Ridges are then made 6 inches high, 2 feet wide, and 3 feet apart. The creepers are cut on either side of the nodes between two leaves, of the length of two inches each. These little bits of the stem are planted in with the hands, two inches apart, and covered with straw in order to protect them from the sun. They are then watered from a *kalsi* or earthen vessel four or five times during the day for a month, so that the soil during this stage may be kept perfectly moist. The straw is removed after this period, and when the plants have attained a height of about six inches, *i.e.*, after two months, *inkar* stalks are planted in by the roots, and the stems tied to them with *jan ghas* (a grass), so that the creeper may all the more readily twine round its support. Manure is now applied and covered over with earth, which is spread over the ridges round the roots to a height of about two inches. The watering is continued on alternate days, irrigation being necessary throughout the year with the exception of the three rainy months of Sravan, Bhaddra, and Aswin. The months of Ashar and Sravan are the most suitable for planting, though it is carried on also in Magh and Falgun. The cultivation of betel-leaf succeeds better in the rainy-weather months, when the expenses of irrigation are diminished.

Manuring.—The best manure for this crop is mustard oilcake, which is applied four or five times during the year. Very often turmeric, *birhi* and rice are ground together and mixed with the cake before its application in Sravan and Bhaddra, the object being, as the Uryas say, 'to give warmth to the soil,' so that the creepers may not rot off. Dung is not applied, as it attracts insects.

Harvesting.—Leaves are fit for plucking after a full year. When ready, the lowest leaves are first plucked off, and then sorted according to the quality, when, being placed one above the other in a basket, they are kept moistened with a piece of cloth, and sold off whenever necessary. When the stems have attained the height of the shed in which they are grown, they are bent down into the ground, covered with soil, watered and manured as usual, when they are found to throw out roots, which soon spring up into fresh plants. If not affected with disease, the same creeper is said to continue supplying leaves for fifteen or twenty years. My own opinion, however, is that the soil gets exhausted after the first five or six years, and is not fit for the continuation of the same plantation.

Diseases and pests, &c.—(1) *Ganda moodia.*—This disease attacks the leaf at all times of the year. Its effect is as follows:—The leaves do not attain their proper dimensions. They continue getting smaller and more stunted and deformed as they are found higher up the stem until, as the disease continues, those at the top become mere dots. The stems themselves cease bearing leaves and become short and stunted.

(2) *Cheetola.*—This also attacks the crop throughout the year. The leaf gets dotted with a yellow mark, which increases in size until it fills up a good portion of the surface of the leaf, when there also appears a black centre in the midst of the yellow patch. The leaves then begin to wither and are not saleable. When one leaf is attacked the leaf next it also generally gets stained, the disease spreading very rapidly.

(3) *Halida.*—This occurs, like the above, in all seasons of the year. The leaves turn wholly of the colour of turmeric; hence the name *halida.* The result is that the whole creeper soon dies.

(4) *Dhaya.*—This disease attacks the roots in Falgun, Chaitra, Baisakh, and Jaishti, and is evidently due to the high temperature and scarcity of water during these months. Artificial watering does no good, as the heat of these months tends to rot the roots under ground, which become of the colour and consistency of *dhai* (tire). When the rains set in after Jaishti, the stems throw out fresh roots from upper portions, and those entering the ground help to save the crop.

(5) *Angari.*—This disease is said to be brought on by the heat in the months of Baisakh and Jaishti. It is due to a fungus which attacks the stems six inches above ground, the result of which is that the plants get covered with a black powdery substance and soon die.

(6) *Dholoi.*—This is a small insect, white in colour, of the size of a grain of sand. At all times of the year this insect attacks the back of the leaves, giving the whole leaf a whitish appearance. The destruction of the leaf, however, does not as a rule destroy the vitality of the creeper, which after the attack shoots forth fresh leaves.

(7) *Dholi poka.*—This is a very small white insect which proves very destructive to the whole crop, attacking all plants, old and young. The plots which are thus infected cannot grow *pan* for the next two years.

Besides these, wild pigs break through the thatching and do a great deal of damage, while stormy weather in Baisakh and Bhaddra has been known to sweep off the crop wholesale.

Cost of cultivation and yield.—According to the information gathered from the *pan* cultivators, the cost of cultivating a *gunt* (taking it equivalent to about $\frac{1}{30}$th of an acre) of land may be put down roundly at about Rs. 10. with the following details:—

	Rs.	A.	P.
Bamboo framework	3	0	0
Inkar	2	0	0
Labour and watering	2	0	0
Manure	2	0	0
Turmeric	0	2	0
Birhi	0	0	6
Rice	0	0	6
Rent	0	1	0
Total ...	9	4	0

According to this calculation, the cost of cultivation per acre would amount to about Rs. 300. The money value according to the same cultivators amount to about Rs. 400 per acre. It is difficult, however, to form a correct idea of the actual receipts, as no accounts of any kind are kept by the cultivators.

Inkar for pan cultivation.—A small plot of waste land having been selected near the *pan* garden, the ground is dug with the *kodali* in the month of Ashar, and holes are then made in it reaching to a depth of two feet, with a space of three to five cubits intervening. Then a clump of the reed is brought from a neighbour's field, with root, stem and leaf entire, and planted into these holes. No special care is now required, although watering becomes necessary, when the planting is done, as is sometimes the case, in the month of Kartik.

The crop is ready for use six months after planting, when it is cut to the ground, and used for thatching the sheds and supporting the creepers. The stalks that are left on the ground are allowed to stay on for a second crop for future use either for the same purpose or for fuel. It is found that ten clumps, each containing about four or five separate plants, are sufficient to lay out one *gunt* of land.

30.—*Tamáku* (*Tobacco—Solanum nicotianum*).

Extent of cultivation.—In the year 1873 the area under cultivation was estimated by the Collector to be 2,020 acres. This figure seems to have been under-estimated, as four years later, without any explanation of the cause of increase, the approximate tobacco area was returned as 8,000 acres. After consulting the statistics of the year 1891-92, it would be more correct, in my opinion, to estimate the approximate area at 16 square miles or 10,240 acres.

The chief localities for the cultivation of the tobacco leaf are the alluvial lands along the banks of the numerous rivers forming the delta of the Mahanadi and Brahmani. On going along the Kendrapara Canal, one may notice that some 30 or 40 acres of land are under cultivation on the *pattu* (silt) soil between the Chitartala and Mahanadi at a distance of from 20 to 25 miles from Cuttack. In the Jajpur subdivision, the same may be noticed along the Kharsua. In Kendrapara the chief localities for growing the crop are Aul and Kalamatiya. In small patches tobacco is to be found cultivated all over the district.

Soil.—Tobacco flourishes best in alluvial soils, enriched by the silt deposited by floods. It is also grown in homestead lands to some extent. A loamy soil is generally considered suitable by the raiyats.

Varieties.—There are several varieties of tobacco grown in the district, some of which take their names from the places where they are principally cultivated. It would suffice to mention the following:—*Kabi*, *mandhota*, *kusumi*, *katia*, *padmabati*, *denkhanari*, *saibiri*, *balishari* and *motihar.*

Nursery.—In the beginning of Kartik, when the soil is yet dry, a suitable place is selected near the homestead. The colour of the land here is blackish, and is required to be of a rather stiff clayey nature, and one which receives the cowdung and ashes of the village. This manure is collected throughout the year and then ground down from time to time, so that it gets perfectly rotten before it is used The selected spot is well ploughed ten to twelve times, at intervals of four days, each ploughing being followed by a careful harrowing and weeding. This ploughing is done in all directions, which followed by the *mahi* or harrow produces a fine tilth.

A main drain is dug across the middle of the land to serve as an outlet for the water, the depth of which is about five inches and the breadth six to seven inches. This main receives the water from smaller channels cut longitudinally at distances $2\frac{1}{2}$ hands apart, this distance being considered a suitable one for working and weeding the land with little labour. All these drains are made by the *kodali*, the earth from two adjacent drains forming an intermediate ridge. When the land has been thus prepared, each plot receives rotten manure from the homestead heap. That which has been rendered more workable by having been used as a nursery the previous year does not require much manure, as after the seedlings have been removed, it receives the household and village refuse from time to time. Though no system of rotation is carried out in tobacco fields, in the nursery jute always follows tobacco, as the same land does not seem to grow good tobacco seedlings for more than three years. After this period, jute is grown and reaped on this land for two years, and is again followed by tobacco for three years. After manure has been applied, seed is sown and the soil levelled over by the hand to cover it. The bed is now covered with straw to keep the ground cool. If this precaution be not taken, germination will fail altogether. On the sixth day, the straw is lifted, the earth removed from the spot, and the seeds examined. Should they show signs of germination, the straw covering is altogether removed, and the ground watered thrice daily for a period of fifteen days. On the other hand, if the seeds have not sprouted at all, the straw is not removed, the watering being given over the covering. The same examination is held every morning, and the watering continued until the sprouts begin to appear. In this case, too, the watering goes on for fifteen days. The plants appear like little sand specks generally on the eighth day after sowing, and fifteen days after this they are only about one-eighth of an inch above the ground. The plants are now watered only twice daily, *i.e.*, morning and evening, till they are ready for removal. This is generally three months after sowing, when the plants have attained a height of an inch, having produced by this time some ten or twelve leaves.

Manuring.—Manure is very seldom given, as the crop being sown on alluvium really gets all the manurial benefits of the silt deposits left on the receding of the flood water. When grown on high homestead lands, cowdung and house-refuse are used, but the crop in spite of this is generally not very flourishing on such lands. There is a belief among the raiyats that manure applied at this stage produces a very poor and weak leaf.

Mode of cultivation.—The preparation of the field in which tobacco is to be cultivated begins on the day that the seed is sown in the nursery. The land is repeatedly ploughed in all directions, until such a tilth has been obtained that "an earthen vessel of water thrown on it will not break but sink into the ground." The number of ploughings is sixteen, and the number of harrowings the same, the operations continuing on for a period of three months, until the ground is thoroughly well levelled.

Removal of plants from the nursery and planting in the field.—Only the most forward of the seedlings are removed at intervals of eight days. The earth round each plant is loosened by a pointed sickle, and then well watered, so that it becomes soft, and the removal of the plant rendered easy. The plants are plucked by the hand in the morning, and gathered carefully in a basket which is covered over with moistened plantain leaf to keep them cool. After the midday meal, the raiyat sets out with these seedlings for transplantation. Holes about three inches in depth are made with the *kankh* one cubit apart, this distance being decreased according to the quality of the land. These holes are moistened with water, the seedling held between the forefinger and the thumb, and a receptacle having been made for it by pressure of the forefinger, the plant is put in and the soil is then very carefully pressed round it. The next morning the first watering is given. On the third day, another watering follows, the third and last being given on the fifth day. After the plants have established themselves nothing is done until they have developed twelve leaves. The buds (*agals*), axillary and terminal, are all carefully broken off, the former requiring to be pulled away three or four times, once being sufficient generally for the terminal buds.

Harvesting and curing.—Three months after sowing, the leaves begin to be spotted with reddish dots and begin to show signs of withering at the apex. The stalks also begin to lose colour. The cutting now commences, the plants being cut two inches underground with the *kankh*. Sometimes the maturity of the crop is so retarded that the cutting is done so late as April. This I noticed at Indpur, and, as was to be expected, the produce was estimated at less than an 8-anna crop. After being cut, all the plants are removed to some grassy plot, where they are spread out singly till the evening, and in fact till the next morning to receive the night dew. The harvested crop is allowed to remain in this condition for the whole of the second day, when it begins to attain a reddish tinge. On the third morning, as soon as the sun rises, the dew is shaken off and the plants heaped together, moistened with water to induce fermentation. These heaps, which are tied together with paddy straw, are allowed to lie out for two days and two nights. They are then untied, each stalk is now split from the root to the apex, and then heaped together again immediately, being kept in this condition for two more nights. The midrib of the leaf is now examined. If it has acquired a blackish tinge, the leaves are

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exposed to the rays of the sun, and then to the dew at night. When they are yet soft with the night dew, they are again heaped together, and kept in this condition for two nights more, when they are put out in the sun about 4 o'clock to dry, and then again exposed to the dew for three nights. They are untied once again and exposed similarly to the sun at 4 P.M., and then heaped together and allowed to lie in this condition for three more nights. Finally, they are once more laid bare to the sun at 4 o'clock, and again tied into heaps to lie in that condition for the following four days and nights. On the fifth morning now, before sunrise, twelve to fourteen plants are tied together in small bundles and put together into a large heap, so that the roots point outwards. This heap remains exposed for five days and nights, the only covering being that of straw on the top to prevent the leaves from being burnt up by the sun's heat, and on the sixth day the stalks are singly taken and shaken by the hand in the wind to counteract the effects on heating to which it has been subjected in the heap. It is similarly arranged a second time and allowed to lie out for the same number of days. The stalks are now again shaken and then taken home, when they are stored in a similar way to that described above, the only difference being that the heap lies on straw and is tied closely together with rope and then weighted with stones or wood. The tobacco is ready for sale in another 15, 20 or 30 days. In some places it is the practice to bury the leaves in the ground. After having been exposed day and night for some time, they are wrapped in straw and then put under ground for a month. They are then taken out and exposed for a few days, after which they are buried a second time with the back of the leaf uppermost for 64 days, when curing is considered complete. The pits in which the leaves are buried are made on the principle of *silo* pits, care being taken to cover the sides and bottom with straw, and to cut drains along the top to allow the rain water to drain away.

Outturn.—The average produce of the Orissa Division has been computed at 12 maunds of dried leaves per acre (one maund being taken as equivalent to 80lbs), but in the rich and moist river banks of Cuttack the yield is often as high as 18 maunds per acre.

The cost of cultivation varies a great deal according to the circumstances under which the crop is grown. Some bestow no labour whatever, being satisfied with what they get from their homestead land for their own consumption. Where it is cultivated on a larger scale, the following, which is taken from a report published in the year 1874, very fairly represents now the average cost per acre throughout the district, though in many instances it does not exceed Rs. 15 :—

	Rs.	A.	P.
Cost of tillage	3	0	0
Transplanting	3	0	0
Seed	0	1	0
Irrigation	5	0	0
Trimming stems and tearing off buds, &c. ...	6	4	0
Cutting and curing	2	0	0
	19	8	0
Rent	12	8	0
Total ...	32	0	0

The quality of the tobacco cannot be said to be very good. Its smell is generally offensive to Europeans, and its taste is very sharp and raw.

Price.—Most of the tobacco is sold at the village markets in bundles, each bundle containing three, four or more leaves without any regard to weight; hence it is very difficult to give any very accurate figures of its sale by weight. Taking the seer of 80 tolahs, it may be roughly estimated that the amount per rupee varies in different parts from 10 to 20 seers.

Diseases and pests.—When the plants are still young they are often attacked by grubs which considerably damage the crop.

Suggestions for improvement.—Experiments were made in the district about twenty years ago with Virginia tobacco, but nothing seems to have come of them. The climate of Cuttack with its sea breezes seems to be suitable to the growth of good tobacco. Taking this with the fact that the Uryas smoke cheroots and not the *hooka*, it seems probable that the encouragement of new varieties may meet with success. At any rate, considering the universal use of the weed, a second trial would not be unprofitable, even if it were found that the imported varieties did not succeed.

31.—*Haldi* (*Turmeric—Curcuma longa*).

Extent of cultivation.—Turmeric cultivation is carried on only by *Telis* and *Guryas* in Cuttack, being grown only to a limited extent, partly on homestead lands, and partly out in the fields. Its cultivation may be seen to great advantage in parganas Balubiri and Asureswar in the Kendrapara subdivision.

Varieties.—The three chief varieties grown in the district are all from local seed, and are known as *deshi* to distinguish them from another variety known as *kuarpuria*, which is imported in large quantities from the Tributary States. They are (1) *dhanna*, (2) *gangakuria*, (3) *hadua*. Of these, *dhanna* is best appreciated for its rich flavour, but the outturn of the two latter varieties is larger than that of *dhanna*.

The rhizomes of the *dhanna* and *gangakuria* varieties are long, differing from the round shape of the *hadua* variety. Of the two former the *gangakuria* is slightly thicker.

There is no difference in colour in the epiderm of the rhizomes, but when broken after being boiled and dried, the colour within of the *dhanna* variety is reddish, that of the *gangakuria* variety is darker in colour (a mixture of red and indigo), while that of the *hadua* variety is light yellow. The *hadua* variety has a very strong flavour and is therefore generally discarded for cooking purposes. With the other two varieties, which are specially valued in the kitchen, it is largely used by women and children, for besmearing their bodies.

Soil.—The crop is not grown on clayey lands, which are found too stiff, and are liable to check the development of the rhizomes, which in this case rot away. A soil containing a mixture of two-thirds of sand and one-third of clay is considered suitable. Stagnation of water is always injurious, and it is for this reason that well-drained high lands are generally selected for the cultivation of this crop. The best crop is grown in land of a loose character which has been lying waste for ten or twelve years. When grown on soils already cultivated it is generally made to follow *biali* paddy.

Mode of cultivation.—Waste land is broken up with a small plough as soon as the first showers fall in Falgun. The ploughing is continued till Ashar, ten to twelve ploughings being found sufficient. The same treatment is followed in *biali* lands. In addition to the ploughing, the land receives two or three harrowings at this time. In the month of Jaishti or Ashar, cowdung is spread on the ground two or three days before planting. The land is then prepared in lines by the plough, and water-channels are made to drain off the water. The lines are very close, eight inches apart, and the distance between the plants is the same. In this respect the planting in Cuttack differs altogether from that in many parts of Bengal, where the furrows are quite two feet apart and even more.

When the crop is being harvested, the central rhizomes are kept for seed, those growing round them being used for cooking and rubbing. The rootlets being broken or cut off, the rhizomes are covered with sand, and kept in this way till the month of Jaishti. They are then taken out and covered over with rotten straw and the mud from thatched roofs and well moistened with water. After eight or ten days the waterings are renewed. The rhizomes are found to sprout within twenty or thirty days.

No harrowing is required after the ploughing, as it is found sufficient to cover the rhizomes with mud by the hand. Rain is now required. If favourable, the plants appear in about fifteen days. When there is a scarcity of rainfall, those that can afford it water their lands, as the crop is injured by absence of rain at this time. As soon as the plants appear, the land is given a hoeing with the *kodali*, which kills the young grasses that now appear. Then follows an earthing. A second earthing is given in the month of Bhaddra. At this time the plants are about one foot in height. The land is first dug with the *kodali* and the soil removed from the roots by the hand, and then oilcake is applied near the roots, at the rate of 2 or 3 maunds per acre of land.

Harvesting.—In the month of Aghran the plants begin to wither, and are harvested in the month of Magh with the *kodali.* The cultivators of Cuttack do not allow the *deshi* varieties to remain in the land more than one year, as is the case in many parts of Bengal, where the harvesting of the first year is supposed to be inferior both in quality and quantity to that of the second year.

When the rhizomes have been dug out, they are rubbed with the hand to clear them of their mud, and the rootlets removed. They are then boiled in water in earthen pots, the mouths of which are carefully closed, leaving but a very small opening. When the water oozes out of this opening, the turmeric is ready for removal. The rhizomes on being taken out are dried in the sun for eight or ten days, when they are ready for sale.

Pests.—White ants attack the young plants and injuriously affect the outturn. There are no other pests to which the crop is subject.

General remarks.—*Kuarpuria* is the variety which commands the largest sale in the market. It comes from Kandh and other places in the Tributary States. There being a large supply, it is cheaper than the *deshi* varieties, and is universally used for cooking, the *deshi* varieties being used for this purpose only by those who grow them in small quantities for their own use. As a rule, all the *deshi* varieties are used for rubbing on the body, as it has a more cooling effect than the *kuarpuria* variety, which is therefore only occasionally used for this purpose. It is said that this *kuarpuria* variety is manured with buffalo blood. The buffalo is killed, and its limbs are then despatched to different parts of the field, the mere trickling of the blood on to the ground being supposed sufficient to give turmeric a rich colour. When the Maharattas were in power, it is said that human blood was made to answer this purpose, the ceremony by which this was done having sacrificial sanctity attached to it.

The *kuarpuria* turmeric lies on the ground for five years before being harvested. There is no objection to eating this turmeric, although manured with blood, the excuse being that the process is not personally seen by the consumer.

32.—*Ada* (*Ginger—Zingiber officinale*).

Soil.—Ginger is grown profitably on a fine sandy loam. A clayey or a wholly sandy soil is considered unsuited to the crop.

Mode of cultivation.—The land is ploughed five or six times in the month of Jaishti until it is well pulverized. It is then laid out in furrows like a brinjal field, and small pieces of ginger are planted with the hand in these parallel furrows at distances one foot apart, the lines themselves being 1½ to 2 feet apart. Cowdung manure is applied immediately over the ginger pieces, one handful of manure being placed over each piece. If there be rain at the time of sowing no water is required, but when there is a want of rain, one watering is given to facilitate the sprouting of the plants. On the ninth day generally, the plants make their appearance. At intervals of 15 days, the land is now regularly cleared of its weeds and jungles, and the bottom of the ridges is loosened once a month by the *kodali.* The object of this operation is to prevent the accumulation of water in the field and to keep the land friable, as with heavy showers it tends to become compact and stiff. At the end of a month, castor-cake manure is applied as a top dressing to the plants, at the rate of ¼ seer to each plant. After applying the manure the earth is heaped up around the plants. Nothing is done after this earthing up till the harvesting time except timely weeding.

Harvesting.—In the month of Kartik some of the ginger cuttings are removed, but the whole crop is not lifted till Falgun. The rhizomes are taken out by the hand, and when brought home are placed upon a bamboo *machan* or platform to keep them safe from ants.

Diseases, pests, &c.—In the month of Aswin, white ants are found attacking the roots of the plants, doing considerable damage to the crop. This is generally a warning to the raiyats to commence harvesting.

33.—*Arrarut* (*Arrowroot—Maranta arundinacea*).

Extent of cultivation.—This plant is only cultivated in private gardens, but as the raiyats are aware of its cultivation, it may be well to give a short account of the way in which it is grown.

Soil.—Arrowroot grows well in a rather sandy soil.

Mode of cultivation and harvesting.—In the month of Ashar the land is well pulverised with the *kodali.* A plough is not generally used, as the root is grown only in small plots of land. Furrows are next made a foot apart from each other, and the seed is sown in these furrows at intervals of the same distance. In about eight days the plants spring up. Weeds are now cleared whenever they make their appearance. The only remaining operation before that of harvesting is earthing up the plants in the same way as potatoes. In the month of Falgun the crop is ready to be harvested. The rhizomes are dug out with the spade. The outer skin or *chopa* being removed, the rhizomes are crushed. They are then placed in water and pressed with the hand. The powdery portion is allowed to remain in the waterpot and the harder portions are taken out to be crushed again. The water is then drained out from the pot and the powdery portion dried in the sun, when it forms the arrowroot of commerce.

34.—*Dhaniya* (*Coriander seed—Coriandrum sativum*).

Soil.—Dhaniya is grown by the riverside on alluvial deposits. It requires a great deal of water, and the best outturn is obtained in a clayey loam.

Rotation.—It follows the late varieties of *biali*, which are harvested in the month of Aswin.

Mode of cultivation.—The preparation of the land commences in Kartik. Like cotton, *dhaniya* requires a large number of ploughings. When sown separately it is broadcasted like paddy. When sown in cotton fields, the seed is put in by the hand in the space between the cotton lines. When the land has been prepared by a sufficient number of ploughings and harrowings in Kartik, the field is broadcasted with seed in Magh. The crop germinates in ten or twelve days. Weeding has to be carefully done now with the *dao*, and the land has to be watered in Aghran, Pous, and Magh.

Cowdung is applied at time of ploughing the land. Oilcake is given only when the seed is sown by the hand, the manure being applied at the time of sowing. The flowering season commences in Pous and Magh. Want of moisture at this time is injurious to the crop.

Harvesting.—The crop is ready for harvesting in Falgun. This operation is done by plucking off the plants with the hand. When there is a large outturn, it is threshed by bullocks, but when in small quantities it is trodden down by the feet or beaten with a piece of wood to separate the seed from the stalks.

35.—*Methi* (*Fenugreek—Trigonella Fœnum*).

Soil.—A soil having a small admixture of clay is considered suitable, although the crop may be found flourishing in all kinds of lands.

Mode of cultivation.—*Methi* is sown early in Kartik. The soil is given some ten ploughings in Aswin and as many harrowings at the same time, and manured with cowdung. The seed is broadcasted in the same way as paddy, ten to fifteen seers being used for one acre of land. A ploughing and a harrowing follow the sowing. No water is given for two days now, but after this time the land is regularly watered at intervals of two or three days. After 10 or 12 days, the plants being about six inches high, the land is well weeded and then left untouched for a month till the flowering season. Care is taken to keep the land moist throughout the whole of the flowering period.

Harvesting.—As usual, the plants are plucked off and then threshed at home.

Diseases, pests, &c.—In the month of December, when there are heavy night dews, the crop is attacked by small white insects, which considerably reduce the yield. The insects are found generally in the young shoots, which get thoroughly shrivelled up and become quite dry. Ashes are sprinkled over the plants to drive them away, but with little or no effect.

36.—*Panmahuri* (*Aniseed—Pimpinella Anisum*)

Soil.—Panmahuri is grown in all kinds of land, doing best wherever there is any deposit of silt.

Mode of cultivation.—In the month of Aswin, ten to twelve ploughings are given to the land when the crop is to be grown. Cowdung manure is then applied at the rate of two carts, *i.e.* 16 maunds, per *mán* of land. No manure, however, is given in alluvial soils. After spreading the manure, a ploughing is given to the land to mix the soil with the manure. In the same month, *i.e.*, in Aswin, the seed is sown broadcasted like paddy, two seers being generally used for a *mán* of land. Should it rain in the month of Aswin, the sowing is postponed to Kartik. The harrow always follows the sowing to make the land thoroughly level. The first watering is given now, followed by a second on the fourth day. After four or five days, when the seedlings have attained the height of an inch, the land is watered once a week up to the month of Falgun, *i.e.*, up to the time of harvesting. In the intervals of the several waterings, care is taken to clear all noxious grasses and weeds. The crop flowers in the month of Pous and comes to maturity after a month, generally towards the close of the month of Magh.

Harvesting.—In the beginning of Falgun the crop is dry, when it is harvested. The plants are plucked off by the hand and carried to the homestead and then threshed with large bamboo rods. The seeds are then removed, a portion stored for the next year's sowing, and the rest sold or consumed; the stems being useful only as fuel.

Outturn.—The produce varies from one-and-a-half to two maunds per *mán* of land.

37.—*Jira* (*Cumin seed—Cuminum cyminum*).

Variety.—Of the two varieties of *jira*, viz., black and white, the former is the one that is generally cultivated in the district, being locally known as *kalajira.*

Soil.—The crop is grown on an admixture of sand and clay.

Mode of cultivation and harvesting.—After the land has been well pulverized near the surface, the seed is broadcasted in the month of Kartik. The *mahi* is always taken over the land after sowing, to cover the seed. Two or three weedings after this operation is all that is necessary, till the harvesting in the months of Falgun and Chaitra.

38.—*Nila* (*Indigo—Indigofera tinctorea*).

Extent of cultivation.—Indigo can scarcely be called one of the crops of the district. It was introduced only a few years ago by the enterprising efforts of a Muhammadan merchant who established a factory at Kendupatna by the side of the Kendrapara Canal, and induced the raiyats to undertake the cultivation of the crop by offering them encouragement in the shape of advances. The factory remained in the hands of its founder, Hazi Jachariah Mahommed, till November 1890, when it was purchased from him by a co-religionist for the sum of Rs. 7,200. The owner pays the canal revenue and supplies the seed. The raiyat tills the land, pays the land revenue, and after harvesting, sells plants to the owner at the rate of five bundles per rupee, each bundle being 3½ yards in length. He carries the plant also to the factory. Such being the conditions, the raiyats in the neighbourhood of the factory find it profitable to grow the crop. From enquiries made on the spot, I gathered that there are some 42 mauzas in Salipur thána in the Sadar subdivision where the cultivation of the crop is carried on. The extent of land cultivated is about 20 acres, each raiyat scarcely cultivating more than half an acre.

Soil.—Lands of a rather high level are considered suitable for the growth of the crop. Those which grow cotton are, therefore, often selected for the purpose. Paddy lands are also used for the crop.

Method of cultivation.—The cultivation is very simple, and the labour connected with the crop comparatively little. One to three ploughings after rain with a light harrowing is considered sufficient at the outset. All that follows subsequently is irrigating the fields. The raiyats have two sowings, viz., the autumn and spring. For the former the seed is sown in the month of October at the rate of about 15lbs per acre of land. The crop is reaped in the end of June, so that it occupies the land for eight months. The spring sowing commences as early as February, and the crop is reaped in

July and August. Very often *mung* is sown along with indigo. After the seed has been sown the field is levelled with the *mahi*. Should the rain not be sufficient, *nalas* or drains are made through the fields for irrigation from the canal. Though some raiyats do not take the trouble of manuring their fields, there are many who consider indigo a deep-rooted and exhausting crop, and so never fail to put in manure in order to renovate the land. The crop is ready for reaping when the flowers begin to appear. It is cut with the sickle, tied in bundles and then conveyed in carts as soon as possible after harvesting to the factory. According to the cultivators, the produce of an acre varies from 3 to 10 cartloads of plants, each cart carrying a load of about 10 maunds. Taking six carts as the average, the produce of plants per acre would be 60 maunds.

Diseases, pests, injurious weather, &c.—An insect known as *kali* is found destructive to the crop. Stagnation of water, especially during the harvesting season, is very injurious, the plants putrifying within 8 or 10 hours. Care has therefore to be taken to let out all this water.

39.—*Kusuma* (*Safflower—Carthamus tinctorius*).

Soil.—Safflower is grown on a loamy soil, such as that which is used very often in the district for the cultivation of wheat.

Mode of cultivation and harvesting.—The land after having been prepared by four to six ploughings accompanied by as many harrowings, is sown with seed which is placed in lines, after which the harrow is passed over once to cover the seed. When the plants have attained the height of about six inches, the field is weeded carefully, this being the only operation necessary till they begin to bear flowers. In harvesting, the petals alone are plucked off, the rest of the flower being allowed to remain on the plants for seed, or for being converted into oil, which is used both for burning and cooking. The dye, which is of an orange colour, is obtained by pounding the petals of the flower. The seeds are said to have laxative properties, and the oil is often used for external application in rheumatic pains.

40.—*Kurbuli* (—)

Extent of cultivation.—This crop is grown only by a few *mális*, having been but recently introduced in the Jajpur subdivision of the district by some Bengalis.

Mode of cultivation.—In the month of Kartik the soil is given six to ten ploughings, and cowdung manure applied to it at the rate of about 100 to 150 maunds per acre. In the same month the planting is done. The top branches of the plants, which are grown in homestead lands for supplying cuttings for the following year, are broken off with the hand and taken into the field and planted in lines at distances one foot apart from each other, the lines themselves being made at intervals of a foot and-a-half. From the day of planting the plants are watered from an earthen vessel daily in the evening for eight successive days. At the end of this time, new leaves will be seen sprouting forth, when the watering is stopped. The earth from the two sides of the plant is now heaped round the roots with the *kodali*. In this way, furrows are made between the lines, which are irrigated once a week with the *tenda*. In the month of Aghran, castor cake is applied to the roots of the plants. Care is taken to remove weeds as soon as they make their appearance. Irrigation is continued once a week till the month of Magh. In Falgun, sand is brought from the riverside and laid in heaps two feet high and three feet apart from each other. The plants are now broken off with the hand and tied in bundles of a hundred each. A small hole is made in the centre of the sand heaps, a bundle placed in each hole, which is then covered with sand. In eight or ten days fresh sprouts make their appearance, the old leaves drying up. In the month of Baisakh the plants are taken carefully out of the sand so that the roots may not be injured. They are then allowed to lie for two weeks to dry thoroughly, when they are brought home and stored till purchasers appear for them.

In the month of Baisakh, before digging out the plants from the sand heap, a few branches are broken with the hand and taken to the homestead to supply the next year's cuttings. Here a small plot is prepared, well pulverized and watered, and the branches are planted in at distances three or four inches from each other. A mat cover is placed over the plants during the day to protect them from the heat of the sun. The nursery is watered twice a day, morning and evening, until the rains set in. The plants remain in the nursery up to the month of Sravan. In the beginning of Bhaddra, branches are broken off and taken into another larger plot prepared similarly, where they are planted and kept till Aswin or Kartik, when they are taken to the fields to be planted as already described.

Outturn.—The outturn of a *mán* of land, where the *mán* is nearly equivalent to an acre, is 25 maunds, the price of which, at Rs. 5 per maund, being the rate at which it is actually sold, amounts to Rs. 125.

Diseases and pests.—*Kalajira*, a small black insect, and *chingura*, a white insect, attack the crop in the month of Aghran, eating up the leaves. These insects have to be killed and removed with the hand.

41.—*Baigana* (*Brinjal—Solanum Melongena*).

Extent of cultivation.—Brinjals form a very common crop in Cuttack. There is scarcely a villager who has not a few plants in his homestead land to furnish him with this vegetable for his meals. On a larger scale it is grown by market gardeners in subdivisional towns and in the neighbourhood of important *háts*.

Varieties.—The varieties grown are generally poor, being small, full of seeds, and often of a bitter taste. Good brinjals, however, may be had from market gardens. The two principal kinds are—

(*a*) the *barsati* or *deara baigana*, which is sown on high lands in the rains in the month of Ashar; and

(*b*) the *palua baigana*, which is sown in the months of Aswin and Kartik on low lands, such as those used for paddy cultivation.

Soil.—The soil considered suitable for *brinjal* cultivation is a fine sandy loam.

Preparation of seedlings.—The land intended for the nursery is generally a small plot near the homestead. It is well dug with the spade, and manured with rotten cowdung, then again hoed and levelled until a fine tilth is produced. Seed is next broadcasted and with the hand equally distributed over the seed bed, and lightly covered over with earth. When the sowing takes place in the month of Ashar, care has to be taken to cover the seed bed with loose straw, which serves as a protection against heavy rain, and which is taken off after four days when the plants begin to sprout. When the seed is sown in Aswin and Kartik, the same precaution is often taken to protect the seeds for a day or two from the excessive heat of the sun, in which case the straw is sprinkled over with water. When the plants are about three inches high, the ground is carefully weeded, two or three weedings in the nursery being generally found quite sufficient. The plants are generally ready for transplanting in about a month and-a-half, so that when sown in Ashar, they are removed to the field in Bhaddra, and when sown in Aswin they are transplanted in Kartik.

Mode of cultivation.—The field has to be ploughed eight or nine times and well levelled with the ladder before it is ready to receive the seedlings. With the last ploughing some growers put in rotten dung and refuse. After the field has been thus prepared, it is laid out in lines about a foot and-a-half apart from each other, and the seedlings are planted at the bottom of these furrows at intervals of the same distance. Care has now to be taken to remove weeds, as they choke the young plants. For this purpose, the soil between the lines is hoed once a week. The lines are also watered occasionally. After a month, when the plants are sufficiently high, they are earthed up, each one having previously received a small quantity of castor cake. The plants sown in Kartik yield fruit from the end of Pous to Jaishti, while the early variety fruits from Aghran to Falgun.

Insects, &c.—The *kankarpoka* or *danspoka* (a small red-coloured insect) and red ants damage the crop to a large extent.

Suggestion for improvement.—As this vegetable forms such an important and universal item in the meal of the Uriya, it would be well to introduce improved varieties into the district. Those at present grown in the village are inferior in size and relish, and may well be substituted by such varieties as are grown in Jessore, Khulna, Mymensingh and other places.

42.—*Bilati alu* (*Potatoes—Solanum tuberosum*).

Extent of cultivation.—This important crop is grown to a very limited extent in the district. Except in Wards' and Government estates, where the cultivation of the tuber has been introduced by this Department, it may be said that potato growing is practically unknown to the cultivators in the interior. It has, however, been raised for some years now by market gardeners in the town of Cuttack. At Sunkerpur (called also Malisai), a village near Chowliaganj, about three miles from Cuttack, there are some 300 families of *chasas* who carry on the cultivation of the crop, besides a few families of *kandaras*. About 100 to 150 acres of land would be a rough approximation of the area cultivated here. A smaller area is cultivated at the village of Torole by about 20 families of *chasas*.

Varieties.—(1) *Deshi.*—The local variety is called *deshi*; it has been cultivated in Sunkerpur and Torole for a very long period, perhaps for more than two generations. The flesh of the tuber when cut presents a whiter appearance than either the Bombay or Nali varieties.

(2) *Bombay.*—The tubers are round but larger than the *deshi.* This variety has been under cultivation for the last five or six years.

(3) *Nali.*—This is so called on account of the colour of the skin, which at the time of harvesting has a reddish tinge. The potatoes of this variety are slightly larger than those of the Bombay variety, and like the latter are round in shape. They have been cultivated in Cuttack only for three or four years. The flesh is of a more yellowish colour than the Bombay variety.

(4) *Silpua.*—This variety is so named from the shape of the tuber (silpua = grinding-stone). It is really the Naini Tal variety, and has begun to be cultivated for the last one or two years by four or five families, the seed having been procured by them from the bazar from a Muhammadan who had imported tubers for consumption.

Soil.—Irrigation being indispensable for the crop, it is cultivated by the side of canals, or in the proximity of tanks. Well water is not resorted to for this crop, as a great deal of water is generally required, for which the *tenda* is found most convenient. The land in the above village on either side of the canal is rather stiff and clayey, while that beyond the village is a loam. The crop is cultivated on both these kinds of soil. The idea of the raiyats is that a clayey soil gives a better outturn than a sandy soil, but at the same time they recognise the necessity of making the soil loose by digging and ploughing until it gets thoroughly pulverized. Advantage was taken years ago when a great deal of silt was deposited by the Mahanadi near Cuttack to grow potato on this alluvium. The outturn was very good and the tuber large, but it was found to rot after a month. Ever since, the raiyats have discontinued growing the crop on alluvial soils.

Seed.—The middle-sized tubers are generally selected for seed, and are considered better than the small ones, which the raiyats say take a long time to germinate.

Immediately after the harvesting, the potatoes are sorted, then the largest and smallest are taken out to the bazar, while the middle-sized tubers are removed to a *machan* or platform in the house. On this platform is laid a mat, and on this mat are spread out the tubers, which lie some three to six inches thick. This is not considered a good plan of storing seeds, as many tubers rot for want of sufficient ventilation. Cultivators who are more careful erect a platform of split bamboos fastened together at such intervals as will permit the ingress of air from underneath, though at the same time so regulated that the potatoes cannot get through. Those who cultivate on a small scale and only keep a small quantity for seed, store them in baskets or open *dalas*. The potatoes on being harvested, instead of being collected in heaps on the field, are generally spread out on the ground after being uprooted, the object being to expose them slightly to the sun. The time that elapses between the lifting of the potatoes and carrying them home is considered quite sufficient for drying them, too much exposure to the sun being considered injurious. Should the tubers, however, be very moist from rainfall, they have to be well dried before being stored. After storing, from time to time, all rotten ones are taken out from the heap and thrown away.

When stored in the months of Bhaddra and Aswin, a disease called *bhadui* makes its appearance, which is the same as the *ladhara* or *lac* disease noticed in Mr. Sen's Burdwan report. The potato first gets covered with a white powdery substance around the eyes, which when pressed with the fingers becomes red. It then rots and becomes watery within. In the same month a small insect (*lagaphunia*) attacks the sprout of the tuber. The insects cover the shoots. Potatoes so attacked are sown sometimes, but it is found at the time of harvesting that their product is similarly affected.

Rotation.—Potato is grown on the same land year after year. It follows either *biali* paddy or vegetables such as *barguri*, *jhingha*, *bhendi*, and *phuti*. It is said to do better after the latter. By those who have large areas of land, the soil is allowed to remain fallow after the potato crop, till it is time again to plough. On such lands the best outturn is obtained, and a better price also fetched in the market, as the crop can be harvested earlier.

For early planting on the lands just described, the plough is taken over the land in the month of Bhaddra as soon as the rains cease, and the tubers are sown in the month of Aswin; while when it follows vegetables and *biali* paddy, these crops being harvested in Bhaddra, the land is not ploughed till Aswin, and the tubers not sown till Kartik. Of the different varieties, as has been remarked already, the *deshi* is sown late, while the others are sown early.

Mode of cultivation.—The tubers are not sown till the land is thoroughly pulverized. For this purpose some ten or twelve ploughings are given. When the soil has become quite soft and powdery it is given a last harrowing to make it quite level and plain, and then with the *kodali*, furrows and ridges are made at intervals of 15 inches. The mud is still further removed from the bottom of the furrows by a small hand-spade called the *hath kuri*, and cowdung applied in these lines. This manure is also sometimes applied at the time of ploughing. With the hand, the cowdung is mixed up with the earth and the tubers then sown in the lines. For larger tubers, the distance between is six inches and for smaller tubers four inches. The earth from the ridges is placed over the tubers about two to three inches thick to protect them from the heat of the sun. The tubers are not cut but sown entire. Those with a larger number of eyes are preferred, as they give a better outturn, according to the raiyats. The plants of the Bombay variety make their appearance above ground sooner than the *deshi* variety. When the land is hard and dry, the germination is retarded. In this case, recourse is had to watering the lines from earthen vessels. When the heat is very great, three or four such waterings are given at intervals of three or four days, but when the ground is soft, the waterings are given at intervals of five or six days. Eight or ten days after the plants have appeared above ground, when they are about six to eight inches high, the land is weeded with a small sickle; after this it is dug with the *kodali* and then levelled with the hand. A day or two after, the earth is removed from near the roots and formed into ridges; again at this time oilcake is applied to the roots and the plants earthed for the first time. Two waterings with the *tenda* follow when the land is clayey and stiff, the waterings being given at intervals of eight days. When loamy they are given at intervals of five or six days. The plants are then earthed up for the second time, and left untouched for two to four days, after which they are carefully watered. Eight to ten waterings generally suffice. The *janta* and *seni* are also used for irrigation.

Harvesting.—Deshi varieties are harvested in Falgun and the other varieties at the end of Pous and the beginning of Magh. The tubers are lifted, as in other parts of Bengal, with the *kodali*.

Diseases and pests.—(1) *Biruria.*—This is a disease which makes its appearance about 15 to 20 days after sowing. The stems become weakly and shrivel up, the leaves fall off to the ground, and the outturn becomes almost *nil*, only a nominal yield being sometimes obtained.

(2) *Bhuranga.*—This shows itself in the month of Aghran at the time of earthing. The leaves curl up, but the raiyats say the outturn is not seriously affected.

(3) *Kakura.*—This is a small caterpillar of a yellowish colour which attacks the leaves. It is generally found on the lower side of the leaves. When in small numbers, the insects are shaken off the leaves and killed, but very often they are so thick that they totally destroy the crop.

(4) *Kalapoka.*—This is a black caterpillar which appears at the time of the watering which is given after the application of oilcake. It attacks the stems immediately above the roots, boring into them, and cutting them away from the root. The soil about the plants is removed, and the insects singled out and killed.

(5) *Angadui.*—This is a red ant which attacks the tubers. It is discovered only when the tubers are being lifted.

(6) *Kalkattra.*—This is an insect of a greyish colour, which proves very destructive at times, being found only when there is an accumulation of water in the fields.

Suggestions for improvement.—As has been already remarked, the cultivation of potatoes is practically unknown in the district. In many parts of the interior I noticed that the raiyats had only heard of *bilati alu* and had but a very vague notion of what like the tuber was. Even in the Sadar station, where this crop has been grown now for some years by *malis*, the quality of the tuber is very inferior. I would therefore strongly advocate the introduction of this crop on a large scale into the district. The soil in most parts is suitable to its growth, and facility for irrigation is afforded by canals. If the example set by the raiyats of the Madhupur estate may be taken as a criterion, it may be said that the raiyats of the district generally may be induced to adopt its cultivation. In the first year that potato cultivation was introduced into Madhupur, where the outturn obtained was very satisfactory, the Manager of the estate, under my instructions, distributed a very small quantity of hill seed (Naini Tal) among the raiyats who, under the guidance of a trained cultivator, whom I had sent from the Burdwan Experimental Farm, cultivated the tuber in small odd pieces of ground in their homestead. This proved so far successful that the next year (1891) there was a demand for 20 maunds of seed from the Manager, of which almost half the quantity was bought up by raiyats. It is hoped that there will be a still greater demand the coming season. Experiments have also been carried out in this direction in Banki with comparative success. Much may be done with potato cultivation if the matter be taken up by the local authorities and by the influential residents of the district.

43.—*Lanka* (*Chillies—Capsicum frutescens*).

Varieties.—There are several varieties known in the district, among which may be mentioned the following:—

(1) *Dhakhina.*—The fruit is of a long shape and of the size of a man's finger.

(2) *Surjamukhi.*—The fruit is more pungent than that of the first variety. It has the same long shape, but is half the size of the former.

(3) *Dhania.*—So called as it is not much bigger than the size of a grain of rice. This variety is not cultivated, but grows from the seeds ejected with the droppings of crows.

(4) *Kanguriá.*—A very thin variety, and about an inch in length.

(5) *Bigonia.*—So called from the similarity of the shape of the fruit to a small brinjal.

(6) *Jari or Bistamarich.*—A very large variety, known commonly as capsicum, and grows only in the gardens of private gentlemen.

Soil and mode of cultivation.—It will suffice to give particulars of the cultivation of one of these varieties, viz., the *Kanguria*, as all the others are grown in more or less the same way. The soil in which it flourishes best is a loam. A small seed bed is made near the homestead, in which the seed is sown in Magh after the land has been ploughed and well powdered. Straw is used to cover the seed when sown in order to protect it from the sun, and water is sprinkled over the straw with the hand to keep the ground moist. The plants appear in four or five days, and when six inches high are ready for transplantation. The preparation of the field and the after treatment of the crop is the same as that for brinjals, and the flowering, fruiting and harvesting seasons come round in the same months.

44.—*Piaj* (*Onion—Allium ascalonicum*).

Varieties.—Four principal varieties of onions are under cultivation, viz. *dhabala*, *nalia*, *alti*, and *patali*.

Dhabala is whitish in colour like garlic, and is smaller in size than *nalia* which, as the name implies, has a red colour. The *alti* variety produces the smallest onions of them all. It derives its name from its being grown especially in the pargana of Alti. The colour, like *nalia*, is red.

Patali is white in colour, corresponding to the Patna onions of Lower Bengal. The bulbs of this variety, which are not grown except by a few market gardeners, are larger than those of the others.

(1) *Dhabala, Nalia, and Alti varieties.*—*Soil.*—These three varieties of onion are grown in loamy, clayey and alluvial lands. A sandy soil is not adapted to their growth, as it is not able to retain sufficient moisture. On the other hand, a stiff clay is also found too wet. The crops flourish best in a loam, where they are often made to follow *biali* or autumn paddy.

Mode of cultivation.—The soil is thoroughly pulverized and dried by deep ploughings, some seven or eight in number, in the month of Aswin. Each ploughing is followed by one or two harrowings until the land is quite level. The field is laid out in beds by water channels, and the ridges and furrows made at intervals of a foot. Holes are made in the bottom of these furrows ten inches apart from each other, and the bulbs are sown with the hand in these holes and then covered over with earth. Cowdung manure, when used, is applied to the soil after it has been well powdered, at the rate of about 50 maunds per acre of land. On the third or fourth day after sowing, the furrows are watered for the first time. This watering is continued once a week until the crop is harvested. Care is, however, taken that there is no accumulation of water, which has a tendency to cause the plants to turn yellow and then die away. The soil around the roots is therefore often loosened to remove weeds as well as excess of water. At the end of Aghran the plants begin to flower. These flowers are taken away by the raiyats, so that the onions may mature fully.

Harvesting.—When the plants become dry, the bulbs are dug out with the *kodali*. This operation is generally done in the months of Magh and Pous. By some raiyats, however, the crop is sown as early as Ashar and reaped in Bhaddra.

Diseases and pests.—In the month of Pous, the green leaves of the plants are often spotted with white marks owing to foggy weather, and the outturn under such circumstances is generally reduced. From a disease known as *sarsa rogó* some bulbs rot away just after the sowing on account of an excess of moisture in the fields.

(2) *Patali.*—This variety is also grown on loamy and alluvial soils. The land having been converted into a good tilth in the month of Kartik, some cowdung manure is mixed with the soil. Beds are made in the usual way in the field, and furrows and ridges constructed at distances of eight to ten inches from each other. The plants having been propagated from seed, are transplanted in these furrows at distances of six inches from each other. Water is now given once a week till the harvesting commences in the month of Pous. Weeds are always cleared with the *kuri*, as they choke the growth of the seedlings. The nursery consists of a plain wooden box, which is filled with rich earth. In the month of Aswin, the seeds are sown in this wooden vessel after the soil in it has been made quite powdery and has been well mixed with rotten dung.

After sowing of the seed, water is sprinkled over the box by the hand at intervals of two or three days. The seed germinates within a week. After 20 or 25 days, when the seedlings are about six to eight inches high, they are considered strong enough to be transplanted, when they are removed to the field and sown in the method above described.

45.—*Lasun or Rasuna* (*Garlic—Allium Sativum*).

Varieties.—There are three varieties of this edible bulb grown in the district. The first is known as the Bombay, and is grown only to a limited extent in the gardens of well-to-do families. It is white in colour and nearly double the size of the large *deshi* local variety. It is the latter which is generally cultivated by raiyats, who use the bulbs for their own consumption as well as offer them for sale in neighbouring hâts. It has generally a reddish tinge, and is of better quality than a second *deshi* local variety, which is of a white colour.

Soil.—The raiyats, when growing onions for their own consumption, generally use small plots of land in their homestead. A clayey soil is supposed by them to give a larger outturn than a mere sandy one. When raised for the market, alluvial lands by the riverside are generally selected.

Mode of cultivation.—The homestead plots being very small as a rule, are dug with a *kodali*, while *pattu* or alluvial fields are ploughed some fifteen times, the object in both cases being to pulverize the soil thoroughly. The land is thus prepared usually in the month of Pous. Lines are made across the fields about six inches apart, and the bulbs planted along them at intervals also of six inches.

The plants of the previous year which are kept for seed are allowed to remain in the field after the harvesting of the crops. When the upper leaves of the plants are quite dry, they are rooted up in the month of Chaitra, and after having been dried for ten days in the sun, they are stored in the raiyat's hut, till the time of planting in the month of Aghran, Pous, or Magh. The outer scales of the bulbs are removed before planting.

Holes are made with the sickle in the lines above referred to, and one bulb put within each hole, which is then covered with earth. The fields are now watered. The plants appear above ground in from ten to fifteen days. Within a month of their appearance, the soil is dug along the rows of the plants, and oilcake placed in the bottom of these rows and over this cowdung. The land is again watered, irrigation being continued quite three months after this period, when the crop is ready for harvesting.

Harvesting.—The implement used for uprooting the bulbs is the *kankh.*

Diseases, pests, &c.—The only garlic pest known is a white thin caterpillar with a black head, which attacks the bulbs after they have been stored.

46.—*Kandamul* (*Sweet potatoes—Batatus edulis*).

Varieties.—Two varieties are known in the district, viz., *nali* and *dhara*, distinguished according to the colour of the skin, the first being red and the second white. The roots when cut, however, both display white surfaces. The one is liked by the people just as much as the other and grown to the same extent, although by some the white tuber is supposed to have a more delicate flavour.

Soil.—The soil selected for cultivation of this crop is very loose and sandy. It flourishes well also on a loam, and though grown sometimes on an alluvial clay, the outturn in the last case is very inferior, both in point of quality and quantity. It is grown often in *puria* or waste lands that will scarcely grow any other crop.

Mode of cultivation.—It is found sufficient to plough the land three or four times. This is generally done in the month of Bhaddra. In the same month parallel furrows are made by the *kodali* as in a field of *saru* (caladium), one foot apart, the ridges by the side of the furrows being one-and-a-half feet high and one foot broad.

The crop is propagated by cuttings, which are obtained from creepers raised in a plot of land near the homestead, generally in a damp locality. Suitable lengths (one to two feet) of the tops of these creepers are cut off, containing two or three knots, during the sowing season at the end of Bhaddra. They are then twisted into a double fold, and small holes being made with a sickle along the ridges at intervals of six inches, these doubled-up cuttings are placed by the hand in those holes with the loose ends upwards. Some earth is then placed lightly over the lower end of the cuttings, leaving the tips of the shoots above ground. No further operation is necessary at this time. If, however, it so happens that there is no rainfall on the day of sowing, the cuttings have all to be watered. In a few days the old leaves dry up, new roots are sent off under ground, and new leaves appear above ground. Twenty days after sowing, when the plants have grown to a length of two feet, they are earthed up. The field is then left untouched for three or four months, *i.e.*, until the roots are ready for being lifted.

Harvesting.—Towards the end of Pous, and more generally in Magh, the parts of the plants above ground are cut off and replanted either in the raiyat's homestead land or in some lower land where sufficient moisture may be retained in the dry season. These are kept on to supply the cuttings for the following year. Those which are planted in the homestead land are watered from time to time in the hot season. The roots are at the same time dug out by the *kodali* and taken to the market for sale. They are eaten by all classes, either roasted, fried, or in a curry. A few roots are also obtained in Bhaddra from those creepers which are intended to supply the cuttings.

Diseases and pests.—A small white thread-like caterpillar, often found in cowdung heaps, attacks the roots and injuriously affects the outturn.

47.—*Saru* (*Caladium—Colocasia antiquorum*).

Extent of cultivation.—The caladium forms an important crop in Cuttack. The tuber is very largely eaten by the Uryas, and the greatest care is bestowed on its cultivation. There is, in fact, a class of Brahmans who take their name (Saru Brahmans) from their skill in growing the tuber.. The exact extent of cultivation cannot be given with any accuracy, but, like brinjal, *saru* is to be found grown almost in every village.

Varieties.—There are several varieties, varying in shape and size from regularly rounded plum-like tubers to long irregular shaped rhizomes. The best known of these are the *jhankuri*, *ghatia*, *sanka*, *talia*, *olua*, and *barlindia*. The *jhankuri* is one of the earliest varieties and the *sanka* the latest. The *ghatia* is generally considered the best.

Soil.—As there are many varieties, so they are grown in different kinds of soils. *Saru* plants thrive well on soil in which there is enough organic matter and moisture, The *sanka* variety is grown in low lands, but the other varieties such as *ghatia*, *talia*, and *jhankuri*, suffer from an accumulation, of water in such lands, and are generally cultivated in upland paddy lands and on homestead soils. The *barlindia* variety is grown on still higher lands, for although the crop likes mosture it is liable to rot from stagnation of water.

Mode of cultivation.—For the earlier varieties, such as the *jhankuri*, *talia*, and *ghatia*, the land is ploughed for the first time after the October rains, and this ploughing is continued on till Falgun, when the tubers are planted. The *sanka* variety is sown later on in the month of Baisakh. There are some cultivators who commence their sowing so late as the month of Ashar, when they do away with the necessity of constantly watering their fields. The plant is generally propagated from tubers which are placed in holes three inches deep. A layer of sandy soil is placed over to cover the "eyes" of the tubers, and over this again is put a layer of straw and grass-refuse obtained from old thatched roofings. The heap is then sprinkled over with water at intervals of four days. In about fifteen days they are found to have sprouted, and are ready for planting. Immediately before this operation, the field in which the tubers are to be sown, is well levelled and then laid in ridges and furrows, about a foot apart from each other. Holes are made along the bottom of these lines with the *kankh*, and the tubers put into them with the hand at intervals of about six inches. The above applies to the smaller varieties. For the larger varieties holes are made about a foot deep and about six inches across. The tuber is cut at its joints, and placed with its "eyes" within the holes only an inch or two under the surface of the ground. A little cowdung is applied in each hole, which is then covered over lightly with earth. Oilcake is applied subsequently. For the small varieties, three manurings are generally found necessary, the first of which is given in the beginning of Chaitra, consisting only of cowdung, followed in fifteen days by a second heavy manuring with the same material. A month after, oilcake is applied to the roots of the plants. Nothing now remains to be done, besides watering and weeding the fields, till the rains set in, care being taken when there is an excess of rain to let out the water from the fields.

Harvesting.—The harvesting period extends from Ashar to Bhaddra. When the old leaves all dry up, the tubers are examined, and when ready to be removed are dug up with a spade and taken to the market for sale.

48.—*Kamba alu* (*Yam—Dioscorea sativa*).

Soil.—Yam is generally grown on homestead lands of a more or less clayey nature.

Mode of cultivation.—By the side of the fencing around the homestead lands, holes are dug in the month of Jaishti, about two feet deep and half filled with cowdung manure. In the same month the tuber to be sown is placed in this hole and earth put over it. No further attention is required for the crop.

Harvesting.—In the month of Falgun the roots are dug out; some harvest after two or three years when the rhizomes have grown to a great length. The price in the market varies from two to three pice per seer.

Pests.—Rats are the only pests that do any damage to the crop.

49.—*Mula* (*Radishes—Raphanus sativus*).

Varieties.—Three varieties of this esculent root are cultivated in Cuttack, viz.—

(*a*) The *dakkhini*, consisting of a long tuber, white in colour, grown largely by the cultivators on account of its size.
(*b*) The *deshi* variety, which is also white, but scarcely more than a finger's length.
(*c*) The *balasari* which, as its name indicates, is grown from seed brought from Balasore.

This last is a late variety, the tuber of which is of a somewhat red colour.

Soil.—The crop is grown usually on loose sandy soils, which require to be thoroughly pulverized. There is a saying current among the cultivators that radishes will not grow successfully unless the land be given sixty ploughings (*shātā ororā mulla*). In fact, it should be so soft that an earthen vessel thrown on it will not break.

All raiyats know that the crop requires a great deal of cultivation. A proverb current among the Uryas makes the ploughing of land for radishes the standard for other crops—

> "Shātā ororā mulla,
> Tar ardha tulla,
> Tar ardha gura,
> Tar ardha dhan."

i.e., "sixty ploughings are required for the radish crop, half this number for cotton, half of this for tobacco, and half of this again for paddy."

Mode of cultivation.—Ploughing for the radish crop commences in Bhaddra and continues to the end of Aswin, when the land is broadcasted with seed, receiving immediately after the sowing, cowdung manure at the rate of about fifty maunds per acre. Care is taken that the rains have ceased before the sowing is commenced. Sowing is always followed by the harrow. Immediately before these two operations, however, drains about one-and-a-half feet wide are dug by the *kodali* at intervals of about 25 feet to serve as water channels as well as foot-paths dividing the land into several beds. The seed is sown in these beds. By gardeners, ridges are made and the seed sown in lines like the potato at intervals of about nine inches. After sowing, the chief operation is that of irrigating the land, care being taken to regulate the flow of water, so that it might not stagnate on the field. Cowdung is often applied at this time.

Harvesting.—The crop is ready for being taken up in about a month from the time of sowing, *i.e.*, in Aghran. Only the more advanced are taken up first, the entire harvesting not being completed till the month of Pous.

Diseases, pests, &c.—When night dews are heavy in Pous, the leaves are attacked by insects called *jau pokas*. The tubers in this case lose their good flavour and fetch a small price in the market.

Preservation and preparation of seed.—For keeping seed two plans are followed, viz.—

(1) In the month of Pous the best plants are selected for seed. They are plucked up and then the tuber cut into half. The tapering end is rejected, and the tops of the leaves cut off, and a cross slit cut into the base of this half tuber. The plants when thus prepared (the process being locally known as *khashi*) are transplanted in a separate plot of ground, and allowed to flower and fruit until they are removed for seed, in the month of Chaitra. The ripe pods are now plucked off from the plants, and the seeds crushed out by the feet and then dried and preserved for next year's sowing.

(2) Some cultivators, however, follow the plan of keeping on a few plants to flower and seed in the same field as they were sown, and then removing them for seed in the month of Falgun. This method entails less trouble, but gives a very poor tuber.

50.—*Kakuri* (*Cucumber—Cucumis sativus*).

Extent of cultivation.—This esculent pepo is grown to a large extent by the market gardeners in Sunkerpur near Chowliagang on the outskirts of the town of Cuttack. A few plants may, however, be seen in all homestead lands.

Varieties.—There are two varieties, viz., the *kantali kakuri*, which is larger than the second known as the *mandi kakuri.*

Soil.—The soil suited to the cultivation of the vegetable is one of a clayey nature, and one which is able to retain moisture.

Rotation.—The crop generally follows onions, potatoes and *saru.*

Mode of cultivation.—In the month of Baisakh, when the above crops are harvested, the soil is given two ploughings. Large holes are then dug with the *kodali* at distances of about five cubits from each other. Cowdung manure is put into each of these holes and is covered with earth. Then in the month of Jaishti five or six seeds are placed in each hole. The land is watered on the same day, and afterwards at intervals of two days. The seed germinates on the fourth day, and the creepers begin to flower and bear fruit in Sravan.

Harvesting.—In the month of Bhaddra the fruits are plucked by the hand and sold in the market at the rate of three or four for a pice. The harvesting does not extend over a month, the creepers drying up in Aswin.

Diseases and pests.—The heavy rains of Bhaddra are injurious to the crop, but the greatest damage is done by crows, which eat off the young fruit. Great trouble has to be taken, therefore, in keeping a watch over the crop.

51.—*Lau* (*Bottle-gourd—Lagenaria vulgaris*).

Varieties.—There are two principal varieties differing in the size and shape of the fruit, viz., (1) *dhanga* or *lamba lau*, which is a long fruit, and (2) *golo lau*, which has a rounder shape.

Soil.—*Lau* is seen growing in the homestead land of almost every cultivator, generally creeping on to the roof of his hut, but when raised for the market, it is grown on alluvial lands by the riverside.

Mode of cultivation.—In the month of Kartik, knee-deep holes are dug in the land at intervals of about ten cubits. In the same month two to four seeds previously soaked in water are placed in each of these pits. Before putting the seed in the holes, they are half-filled with loose earth. Germination takes place in four or five days. The creepers bear flowers in Aghran and Pous, and fruit towards the end of the latter month.

Harvesting.—In Pous, as well as in Magh, the gourd is taken to the market for sale. One or two fruits which are intended for seed are kept on the creepers until they are well matured. When thoroughly ripe, they are removed and kept in a safe place at home until they rot, when the seeds are taken out, washed, dried in the sun, and then preserved carefully for the next season's sowing.

Diseases, pests, &c.—A small red insect attacks the leaves of the plant whenever there is an excess of moisture.

52.—*Phuti* (*Mashmelon—Cucumis momordica*).

Varieties.—Two varieties are grown, viz., (1) *handia*, which is round in shape, taking its name from the circular shape of a *handia* or earthen vessel; (2) *lamba*, which is long.

Soil.—*Phuti* grows in all kinds of land, but is found flourishing best in a sandy loam, as, like *lau*, it likes a loose friable soil.

Mode of cultivation.—The land is ploughed four times in Chaitra, then in the month of Baisakh small holes are dug in the ground with a *kodali* as in the case of *lau*. About five seers of cowdung refuse is placed in each hole and well mixed with the soil. Then four or five seeds are put into each hole and slightly covered with the earth. Water is given at intervals of two days. After the plants have come up above ground, the weeds are cleared with the *kodali*, and the soil kept loosened round the plants. In the beginning of Jaishti or at the end of Baisakh the plants begin to flower and fruit.

Harvesting.—The harvesting season continues for two months. Great care is taken at this time to protect the fruits from wild animals and to take up the fruit in time, so that it might not rot on the ground.

Diseases, pests, &c.—Owing to excess of rain the plants are often attacked with a disease known as *haldia kahar*, which injuriously affects the outturn.

53.—*Tarbhuj* (*Watermelon—Citrullus vulgaris*).

Soil.—This fruit pepo is generally grown on the riverside where silt is deposited by floods.

Mode of cultivation and harvesting.—In the month of Aswin or Kartik, and sometimes later in Aghran, holes are dug at distances of four or five cubits from each other, of a depth of about two feet. They are then filled to a certain depth with sandy earth. Cowdung manure is applied to each of these holes, and then four or five or more seeds are put into each hole at distances of three or four fingers apart from each other. Loose earth is placed over these seeds to cover them. The plants spring out in about eight to ten days, and soon begin to creep along the ground. Nothing is done now beyond hoeing the ground and removing all weeds. Fruits are available in Chaitra and Baisakh. The plants generally begin to dry up in Jaishti.

54.—*Chalana* (*Chalanas—Citrullus species*).

Soil and rotation.—The *chalana* melon flourishes well on alluvial soil, the land where cotton is grown being specially adapted for its cultivation. It is generally taken after an autumnal crop like *biali* paddy.

Mode of cultivation and harvesting.—In Kartik the land is given five or six ploughings, after which it is well manured with cowdung. After the manuring, the land receives three or four more ploughings. In the month of Aghran, holes are dug in the field at distances of five cubits from each other, being generally one foot in diameter and two feet deep. The soil of the bottom of the hole is loosened with a spade and then well pulverized, and five or six seeds are placed in each hole at distances of two or three inches from each other. The plants sprout up in a week. When the plants become about two cubits long at the end of Magh, the soil of the whole field is loosened by being dug with the spade. The plants are allowed to creep along the ground. In the month of Falgun they begin to flower, and bear fruit at the end of Falgun and Chaitra. The fruiting season continues to the middle of Jaishti, each plant yielding sixteen to twenty melons during this period.

Diseases and pests.—A white insect about the size of a paddy seed attacks the leaves and fruits, whenever the heat is excessive, leaving the crop with the first showers of rain.

55.—*Baitalu or Baitakakharu* (*Pumpkin—Cucurbita maxima*).

Varieties.—There are two principal varieties of pumpkin in the district known by two different names, viz., *baitalu*, which is red in colour, and *baitakakharu*, which is white. Each of these has sub-varieties differing in the size and shape of the fruit, some being long and others round.

Soil.—This vegetable flourishes best in a sandy soil. Alluvial and loamy lands are also found suitable for its growth, and it is therefore largely grown on the banks of rivers. The creeper is also found growing in the homestead lands of cultivators.

Mode of cultivation.—In the month of Falgun the land is well dug with a spade, until it becomes quite powdery. It is then watered from a well or canal by means of a *kalsi*, and allowed to remain untouched in this condition for about four days. Holes are now made in the ground at distances of about 10 feet, and some three or four seeds previously soaked in water are put into each hole and then covered with earth. When the soil is a loam, a handful of cowdung is placed in each hole at the time of sowing. In alluvial lands no manure whatever is applied, but in light sandy soils, some alluvium taken from the banks of rivers is made to take the place of a manure. Four days after sowing, the seeds are found to germinate. During these four days, the holes are regularly watered once a day in the evening. Within 12 or 15 days the creepers are about a foot long, and in another 20 days they begin to produce flowers. The fruiting season continues till Jaishti. Care is taken during this time to make large holes for receiving the fruit, and twigs are placed round these holes to prevent their being eaten by hogs, cows, and jackals.

Outturn.—From each hole can be obtained about 20 or 25 pumpkins throughout the season. Besides the fruit, the leaves, flowers and tender stems are all eaten in the form of a curry.

Price of outturn.—The pumpkin is sold in the market at two to four pice each, according to size.

Pests, etc.—A small insect about one-fourth inch in length, of a reddish colour, is found attacking the leaves and flowers. Ashes are generally spread over the plants by the raiyats to drive them away, but often with no effect.

56.—*Patal* (*Palbal—Trichosanthes dioica*).

Soil.—*Patal* grows well in a sandy soil, and is often found being cultivated near river banks. A stiff clay has the effect of destroying the creepers.

Mode of cultivation.—In the month of Pous, four or five ploughings are given to the soil, and one harrowing after to level the land. Small holes are then made in the ground, of a diameter of two feet, and at distances of a yard from each other. Five or six seers of cowdung manure are placed in each of these holes, this being the only manure used for this vegetable. Cuttings about two to four inches long containing some roots are placed in these holes (three or four cuttings in each hole). These are next covered over with earth and well pressed. The roots have now to be carefully protected from the heat of the sun. For this purpose, the holes are watered constantly, so that the land may be kept moist, and the roots be thus prevented from drying up. On the eighth day, one or two leaves may be observed. In 20 days, the creepers will have grown to a length of 10 to 12 inches. They are now made to creep over little broken twigs. Care is taken to hoe the land thoroughly after once the plants have appeared above ground, as stagnant water is very prejudicial to the crop. In the month of Falgun, *i.e.*, a month and-a-half after sowing, the plants begin to flower and produce fruit. The fruiting season extends over a period of four to five months from Falgun to Ashar.

The roots are left in the field to furnish the next year's cutting, being planted generally in a new field, as the crop does not grow well on the same land for two successive years. The leaves of the crop are edible as *sag*.

57.—*Janhi* (*Tarai—Luffa acutangula*).

Soil.—*Janhi* grows well in a loamy soil.

Mode of cultivation and harvesting.—In the month of Magh, the ground is given two or three ploughings and one harrowing. Holes are dug as in *patal* cultivation, and three or four seeds placed in each of these holes. Cowdung manure is applied immediately after the sowing, about a seer being placed in each hole over the seed. The holes are then watered, and it is found that in about eight days, two or three begin to make their appearance. In a month's time, the plants are about a yard in length, when they are made to climb along broken twigs, though sometimes allowed to creep along the ground. The crop is supposed to give a larger outturn and better fruit when made to climb up twigs or hedges. The flowering season commences in Falgun, and the fruit continues to be gathered till the rains in the month of Ashar. The watering is continued during the whole time that the crop is on the ground, just like *patal.*

58.—*Kalara* (*Karela—Mormodica charantia*).

Soil.—Kalara is found doing best in a stiff clayey soil. It is grown only to a very limited extent, and may be seen in isolated plots in all kinds of lands.

Mode of cultivation and harvesting.—The land is prepared in the month of Aswin. After having been well dug with the *kodali*, holes are made all over the field at intervals of five or six feet, each hole having a diameter of two to three feet. The seed having been previously soaked in water and dried, four to five seeds are put into each hole, two or three inches apart from each other, and then covered with earth. Castor cake and cowdung are applied in these holes. No further operations follow, except an occasional hoeing to remove the weeds. Bamboo twigs are placed around each hole to enable the plants to creep over them. The fruit is gathered from Magh to Chaitra.

59.—*Uccha* (*Ucche—Mormodica muricata*).

Soil.—A loamy soil is suitable to the growth of *uccha*. It is, however, found to flourish best on lands which have received silt deposits.

Mode of cultivation and harvesting.—The land is dug with the *kodali* until it is well pulverized. The seeds having been wetted and dried are placed in holes three or four feet apart from each other, in the month of Kartik. The holes being covered with earth, the land has to be hoed several times after in order to remove all weeds. The manure, as in *karela*, consists of dung and cake, which is applied at the time of sowing. Twigs are placed around the holes to enable the plants to creep over them. Fruit is obtained from Falgun to Baisakh.

60.—*Bhendi* (*Dhenras—Hibiscus esculentus*).

Soil.—A sandy soil is most suitable for the growth of *bhendi.*

Mode of cultivation and harvesting.—In the month of Falgun two ploughings are given to the land, which is next well levelled. Several lines are made in the field at distances of one-and-a-half feet from one another. Seed is sown in these lines at intervals of one foot from each other. All that is left to be done is to water and weed the land. The unripe mucilaginous capsules of the plants which are used as an article of diet are generally available for a period of two months up to Jaishti. A second crop may be obtained in the cold weather.

61.—*Sima* (*Indian bean—Dolichos lablab*).

Varieties.—There are many varieties of beans found in Cuttack, some of the more important of which are—

(1) *Tuli* sima.—A thin white variety, four inches in length, and quite flat in shape.
(2) *Pottu* sima.—A broad green variety, of the same length as the above, and also flat.
(3) *Chana* sima.—A light green bean somewhat round in shape, and about three inches long.
(4) *Nali* sima.—A broad red coloured variety, about four inches long.

Soil.—There is no particular kind of soil which is selected for growing beans, as they flourish more or less in all kinds of lands. Every raiyat may be seen growing a little for his consumption in the land surrounding his hut.

Mode of cultivation.—Round shallow holes are made in the ground by the *kodali* at intervals of 15 feet in Jaishti. About five seers of cowdung manure are placed in these holes, and at the end of Jaishti three or four bean seeds are placed in each hole, which are then covered lightly with earth. The seeds germinate in five or six days. At this time, the plant is watered at intervals of two or three days. After fifteen days, when the plant is about one-and-a-half feet long, a piece of bamboo or other wood is placed by its side to enable it to creep up. It is sometimes allowed to creep on to the roof of the raiyat's house. If any weeds grow round the roots of the plants, the raiyats clear them away, as they check the growth of the creeper. Flowers begin to appear in Aghran or Pous, and the fruit is ready for sale or consumption about three weeks or a month after.

Harvesting.—The green pods continue to be gathered up to the middle of Falgun. At this time, the creepers are cut off and used as fuel. A few pods are allowed to get quite dry to furnish seed for the next season's sowing.

Outturn.—As there is no regular cultivation, the outturn cannot be estimated. If a raiyat has one creeper, it generally gives him one pice income per day throughout the harvesting period, besides supplying him a little for his home consumption.

Diseases, pests, &c.—In foggy weather the *jau poka*, a small insect, attacks the leaves and stems. Ashes are spread over the plants by the raiyats to drive them away. There is also another insect which bores through the pod in Magh and destroys it altogether.

62.—*Plantain* (*Kadali*—*Musa paradiasica*).

Varieties.—*Patkabara* is one of the best varieties grown in the district, and, like the *sankara*, is eaten when ripe. *Dakhin sagara*, *painsha bautala*, and *chapta bautala* are grown for the kitchen.

Soil.—Plaintain flourishes best in high lands, more or less of a clayey nature, as it suffers when grown below the inundation level. It is generally grown by the side of ponds and in homestead lands, but may also be found cultivated on soil which has received silt from rivers.

Mode of cultivation and manuring.—When grown on high lands the proper time for planting is in the month of Jaishti. Four ploughings are given to the land in the month of Baisakh, then in the following month when the rains set in, holes are dug of a depth of two-and-a-half feet and at distances six feet from each other. Cowdung manure weighing about a seer is placed in each hole, and then the trees to be planted carefully placed, one in each hole, after all the leaves except the centre one have been cut off. Many raiyats, however, are of opinion that it is a mistake to cut off the leaves before planting. Only those that are dry and have been broken by wind or storm or by any accident need be cut off. The holes are then filled up with earth. Some take greater trouble with the preparation of the land. When growing the plants on high lands, one month before planting, they spread pond mud on these lands to the height of nearly a foot, and when the mud is quite dry, they either hoe or plough the lands in order to mix the manure thoroughly with the soil. Care is taken to clear weeds once a month from the roots of the plants. In the month of Kartik two more ploughings are given, and with the *kodali* the soil at the foot of the trees well loosened. From this month, the trees begin to produce fruit.

Twice a year the land is ploughed, viz., in Jaishti and Kartik. In the former month, earth is heaped up round the roots of the plants, and in the latter the soil loosened with the *kodali.* Some raiyats plant in the month of Kartik, especially those that cultivate on riverside lands. The operations in this case are the same, only that the time for them is reversed.

Diseases and pests.—During the rains in Jaishti a white insect, about an inch long, is sometimes found attacking the roots of the plants, when there is a large number of shoots making their appearance round the plants. In such cases, the shoots are dug out and removed to be thrown aside or transplanted in some other place or sold.

SECTION 7.—*Fodder-supply.*

Like other districts of Bengal, Cuttack suffers a great deal from a scarcity of fodder. There was a time when jungle land was everywhere within the reach of cattle, which did excellently well on the food they found for themselves, and furnished good plough and draught beasts for the raiyats. In former times also, there was scarcely a zamindar in the district who did not have his grazing corner in his holding The area of unoccupied jungle land has, however, of late years considerably diminished, and grass lands have nearly all disappeared. With the increase of population, there has been an increase in the area of cultivation, and pasturage tracts have been all converted into arable lands. The raiyats have now to look to their own sustenance rather than to the efficient maintenance of their cattle, and thus it is they cannot afford to keep any corner of their holding for their beasts. They know very well that their cattle would improve on good food, and are fully alive to the utility of growing fodder crops, but insufficiency of food for themselves prevents their poaching on their lands for the sake of cattle. Thus it is that no single fodder crop is grown in Cuttack, and in fact the only fodder preserved for the use of cattle is paddy straw. After the paddy has been threshed out, this straw is stacked in circular shaped stacks. The well-to-do cultivators alone can afford to preserve fodder in this way. They keep as much straw as they require for one year for thatching their houses and feeding their cattle, and sell off the surplus. The poorer raiyats, however, who are in want of money and look to immediate returns from their crops, generally sell all they have, leaving their cattle to wander about and pick up what they can from the stubbles left in their fields, and in such cases for thatching they generally use some kind of coarse grass in the place of straw. The straw of *sarad* or winter rice is generally cut during winter between the months of November and February. The *dalua* paddy harvest follows in March and April, and these two harvests combined serve to keep up the supply of straw till the month of September, *i.e.*, up to the time of the *biali* or autumn rice harvest. The straw, which is now cut, lasts till the harvesting of the next *sarad* crop. Besides paddy straw, the straw of some millets and pulses and of wheat and barley also serve as food for cattle; but as the quantity obtained from all these sources is very little, there is no system adopted of storing the straw obtained from them, which is generally fed off after the crops have been threshed. During the rains, as has been stated in the Chapter on Live-stock, the cattle are grazed on green grass, which at this time of the year alone furnishes perhaps enough food. The names of the grasses which are eaten and relished by cattle are given in the chapter above referred to. The pasturage tracts called *palanda* are almost always used for cultivation too. They are let out to raiyats for cultivation, and when the crops have been reaped they are sold by public auction for the purpose of grazing cattle. In some cases, the highest bidder purchasers sublet such lands to raiyats either for cultivation or pasturage.

Suggestions for improvement.—In the way of improving the fodder-supply, I may here urge the necessity of reserving grazing grounds. During the settlement now in progress large tracts may be set aside for fodder and pasture reserves, so that the evil which has converted grazing into arable land may not continue, as it must inevitably do otherwise. It should now be seen that no undue proportion of waste land be brought under cultivation. The Government may acquire such uncultivated lands and reserve them, and gradually convert thorny brushwood or bare rock and stone into tracts covered with vegetation edible by cattle. Under systematic artificial care and treatment there seems no reason why the ultimate financial results should not more than cover the initial expenses that would have to be incurred in acquiring and protecting the lands. There is a tendency among zamindars, natural under the economic conditions that hold at present, to have all their waste lands brought under cultivation. They offer favourable terms to induce raiyats to break up the jungle and bring jungle land under the plough. Laudable as such efforts are on the part of the zamindar, in the face of the fodder scarcity which is making itself felt more day by day, it seems desirable that they should rather turn their energies to improving these forest lands by cutting down useless brushwood and planting in their place useful trees, such as the *sissu* or teak, which in the course of ten or fifteen years would supply wood which would not only serve as valuable fuel, but be available also for building purposes, or, what comes more under this chapter, by doing away with the jungles altogether, no doubt at some expense to themselves, and converting them into extensive pasture grounds.

However much I may seem to be theorizing, I may nevertheless assert with confidence, that the advancement of agriculture hinges very greatly on some such improvement. When once there are good pasture grounds and enough food for cattle, there must be an improvement in the breed much more than can be looked for at present from any carefully selected system of cross breeding.

Improvement in cattle will be followed by superior cultivation and larger outturn of crops, which will necessarily lead on to an amelioration in the material condition of the people; or, in other words, to an ultimate enhancement of the profits of the zamindar.

In the neighbourhood of the Burdwan farm, where wild grasses are very abundant during the rains, I tried the plan of storing them in silo pits. As the practice involves very little expenditure, it may be strongly recommended to raiyats. As an experiment, however, it may be first of all introduced in the Government and Wards' estates of the district, the Managers of which may be requested through the Collector to put this method of storage to the test. From an old report of the Orissa Division, I have been able to learn that experiments have already been made in this direction by Mr. Taylor at Khurda in the district of Puri. Three silo pits were dug by him in the ground and filled with grass, and then covered over with a heavy bank of earth, well rammed. The ensilage obtained was good, and cattle ate it freely, though horses refused the fodder. There seems to be no reason why ensilage in Cuttack should not be attended with the same success. The cultivation of sorghum may also be introduced with benefit, as it yields a large supply of first class fodder, and can be grown at a nominal cost.

SECTION 8.—*Fuel-supply.*

The district gets its fuel-supply from the jungles of Dompara, Harispur, Kanika, Kujang, Sukinda, Madhupur, Patia and other petty forest tracts. According to the statistics compiled in the Collectorate during the year 1877-78, the area of these tracts amounted to 513·53 square miles. Without any later figures, it is impossible to state accurately the area of the jungle tract at present, nor is it certain that the area given above is accurate. It may, however, be safely asserted that this area has considerably decreased since then, as year after year portions of jungle land are being reclaimed and brought under the plough. The fuel supply from jungles may be said, therefore, to have decreased, and at the same time the price* of firewood has also been rising, and it has been argued that the cultivators have had in consequence to take to using cowdung cakes for the purpose of cooking.

It seems to me, however, that it is not a scarcity of fuel that is to be dreaded, but rather the difficulty of obtaining it. There are still extensive areas of jungle land on the seaboard tract in the estates of Kanika and Kujang, and on the western frontier in Sukinda, which with the other forests of Cuttack are able, in my opinion, to furnish a supply of wood quite equal to the present demand. It is rather the difficulty of communication, and the difficulty of cutting down the fuel and carrying it at an adequately low cost, which makes firewood scarce and dear, and so puts it out of the reach of the raiyat to keep himself well supplied with wood so that he may not have to resort to burning his cowdung as fuel.

This is not all. The difficulty is enhanced by the laziness of the raiyats. The Uryas are not ordinarily given to over-exerting themselves in supplying their wants, and hence it often happens that although forests abounding in small jungle may be well reached with a little trouble, very few will undertake to supply a village with wood, the result of which is that fuel is often bought at an exorbitant rate in the market, while those that cannot afford wood use dung cakes to cook their food, perhaps but once a day. An internal trade in one of the necessaries and comforts of life is thus checked. The forests themselves cannot be said to be in a satisfactory condition. There are no systematically-protected forests in the district, and the forests that do exist in the district are not looked after, so that a large portion of the forest tract contains little or no valuable wood, containing for the most part scrub jungle and thorny brushwood, which renders travelling impracticable.

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* The price of firewood in 1873 was 200 seers per rupee. At the close of the year 1890-91 it was only 80 seers per rupee.

Amongst the underwood one observes Mimosas, Euphorbias, and Cassias. Stretching along the base of the hills on the western frontier are to be seen many trees and plants yielding medicinal drugs, such as the *Terminalia belerica* (*bahara*), *Terminalia chebula* (*harida*), both well known as myrabolams, *Strychnos nux vomica* (*kuchila*), *Cassia fistula* (*sonari*), *Phyllanthus emblica* (*aonla*), &c. The trees which principally supply the fuel are the mango (*Mangifera indica*), tamarind (*Tamarindus indica*), amra (*Spondias mangifera*), *bar* (*Ficus indica*), *palas* (*Butea frondosa*), *kataka* (*Strychnos potatorum*), *kontaikoli* (*Zizyphus napica*), *nirasa* (*Memecylon edule*), *giringa* (*Pterospernum suberifolium*), *atundi* (*Combritum decandrum*), and *bamboo* (*Bambusa arandinacea*). There are several other species which, although furnishing good fuel, are chiefly used for building purposes and for making agricultural implements and household furniture. A full account of these will be given in the chapter on the trees of Cuttack. For the right to bring wood from the jungles, each raiyat has to pay the owner a small fee. Some of the very well-to-do cultivators purchase trees, especially mango trees, belonging to some *tope* of a zamindar, and keep themselves well supplied with fuel throughout the year. Besides the twigs and stems of these trees and cowdung cakes, dried leaves of trees are also gathered into heaps by the poorest classes, and used along with the dried stalks of their crops for fuel.

SECTION 9.—*Live-stock.*

Cows and oxen, buffaloes, horses and ponies, sheep, goats, pigs and poultry, and a few asses constitute the live-stock of the district. Of these, oxen alone are used in agricultural operations. The same bullocks are often used for ploughing and as beasts of burden. Buffaloes are seldom or never used for ploughing. The bull calves are generally sold to traders, who take them away to the Garjats, where they are used both for carting and ploughing. Herds of she-buffaloes, however, are kept by *gwallas* for milk and *ghi*. Cows are also kept for the same purpose.

Breeds.—The breed of cattle in Cuttack is the same as that found in other parts of the Lower Provinces of Bengal, but due to the greater want of pasturage, the stock is more degenerate here than elsewhere. The extensive pasture lands which were shown as such in the early settlement papers have nearly all been swallowed up by cultivation, and large herds of cattle have died from disease, so that a singular apathy is shown in the matter of improving the breed. Faint efforts have, however, been made by individuals to produce good stock by introducing strong up-country bulls, resulting in the establishment of a few superior cattle which may be seen here and there in town, and to a small extent in some mufassal villages inhabited by the wealthier classes of zamindars, who are in a position to house and feed their animals with proper care. A few Deccan bullocks may also be observed in the district, but they are seldom or never owned by the people of Cuttack, coming into the district as draught animals from Ganjam and Berhampur, and returning there after having unloaded their burdens. The cross-breeds referred to above are known as *bara singhias*, while the indigenous breeds are styled *deshi*.

Food.—Ploughing cattle are to be found generally in a poor and lean condition for want of sufficient food. As in other parts of Bengal, they are generally led out in the morning by the cowherd, who almost always is a lad of the village, to feed on grass wherever and whenever available, and in its absence on paddy stubbles. They are kept grazing till wanted for ploughing, when they are marched away by the cultivator to his fields. After work, they are once more allowed to graze, and if too late they are walked home direct to their sheds on the homestead land of the cultivator. During the hot-weather months there is so little food for them that they are reduced to eating the leaves of trees and shrubs. Even the bitter leaves of the *kuchila* (*Strychnos nux vomica*) are eaten by the starving animals, and to such an extent that the milk tastes quite bitter. The shed, in which cattle are housed, is a room of the raiyat's house, which is, however, oftener used for cows than bullocks. They are also kept out on the open ground, surrounded by a bamboo fence and covered over with a small mat, which serves as an awning to protect the animals from sun and rain. Here at night, oxen are generally given some paddy straw or the dried stems of *rabi* crops. In the rainy-weather months, the grass is quite green and abundant, so that the cattle have perhaps enough food at this time of the year; but in the dry months it is not too much to say that they have to eke out their existence on the fields on small handfuls of dry straw and woody paddy stubbles.

She-buffaloes are generally taken to graze the whole day. They live on many grasses and leaves in the jungles which are not touched by cows, and are often allowed to lie out in the open fields instead of being housed at home. They are more profitable than cows, as they yield much more milk, and of a richer quality. Cows are also similarly pastured throughout the day, but driven to their respective homes at night. They are put in charge of the cowherd or *gopal*, who is paid in paddy. It is the practice among owners of large herds of milch animals to put them altogether in charge of the *gopals*, who shift after six months from one place to another, generally remaining near the jungles from Jaishti to Aghran, when grass is abundant, and seeking for other pasturage during the dry months. During the rainy season, large herds of cows and even bullocks are thus driven from the low-lying tracts in Cuttack to graze on the high lands of Khurda. The raiyats, on whose fields they graze, get in return all the droppings as manure. In this case, the cows and buffaloes are all alike kept out in the open air. Small sheds are erected all over the pasturage known as *kurias*, from where watch is kept at night to protect the animals from robbers and wild animals. When housed at home at night, the evening meal of the cow consists of three small bundles of straw and five seers of *kunda* or husks mixed in a vessel of *phan* (*i.e.*, the water drained off boiled rice), representing a total cost of about 2½ pice. Mahajans and other well-to-do people allow a daily ration of about 6 to 8 chitaks of cake, and sometimes give paddy boiled with straw known locally as *kulchi*. In these cases the animals are generally well cared for. They are warmly housed at night in stalls, the floors of which are washed daily, and the calves are kept in a shed separate from the cows. In Bhutmundi, in the Kujang estate, I found a herd of 60 cows belonging to one Arata Mahapatra, who attributed the flourishing condition of his animals to their being fed on distillery refuse, which he always gave in addition to chopped straw and boiled paddy.

The grasses which are eaten with relish by cattle are *dub*, *cheddra*, *kadua*, *mutha*, *kakuria*, *pandasiari*, and *ragra*. The following, when young, serve as fodder, but get too woody to be eaten when ripe:—*Gaichura*, *dalghas*, *keotaye*, *bana ghas*. While on the subject of grasses, it may be as well to give a description of a few which, though not eaten by cattle, serve other purposes. They are—

(*a*) *Nalia ghas*, which is to be seen along the river banks from Bhutmundi to Paradip, and in many places along the coast. On account of its saltish taste, it is not touched by cows and oxen, but is not rejected by buffaloes.

(*b*) *Nara ghas*, which grows to a height of 8 to 12 feet, and is used, like *inkar*, for thatching the roofs of *pan* plantations.

(*c*) *Thandi*, grown near the riverside in order to keep in the silt which is spread over the adjoining land by flood.

(*d*) *Jura* }
(*e*) *Bhaduni* } found in jungles and used for thatching and making mats.
(*f*) *Bairua* }

A very few well-to-do raiyats do sometimes give a little oilcake, as well as some *kunda* or fragments of rice husks, mixed with *phan*, but very few can afford to give this luxury to their working cattle.

Price of cattle.—The value of a pair of country oxen varies from Rs. 15 to Rs. 30, while the larger cross-breds sell for Rs. 50 to Rs. 100 per pair. An ordinary cow giving only about half a seer of milk per day will fetch from Rs. 3 to Rs. 5, while one giving two seers per day will fetch as much as Rs. 12 to

Rs. 15. Larger cows, found generally in the houses of rich mahajans and zamindars, cost as much as Rs. 25. The amount of milk given by these is about three seers per day. Cross-bred cows sell for Rs. 20 or Rs. 25 each; calves fetch from Re. 1 to Rs. 3 each, according to size, and milch buffaloes cost about Rs. 30 or even as much as Rs. 40 each.

Working capacity of cattle.—A pair of ordinary oxen plough generally about 16 cottahs or a full bigha, *i.e.*, ⅓rd of an acre, per day of 5 or 6 hours, *i.e.*, from morning to noon, and when put to the cart drag a load varying from 7 to 10 maunds. The cross-breeds and Deccan breeds, however, carry a heavier weight, reaching up to 13 or 14 maunds. Pack-bullocks ordinarily carry a load of 2 to 3 maunds.

Branding of cattle.—Cattle are branded when one or two years old. An iron instrument, witha wooden handle, called the *charu lohá*, is used for the purpose. Two or more of these irons are heated in a fire of dried cowdung. When red hot, one of them is taken in the right hand of the operator and drawn along the body of the calf just as a lead pencil is drawn over a sheet of paper. When cool, it is replaced on the fire, and a second iron taken out and the operation repeated, and so on until the animal is branded. The animal is first thrown, and its fore and hind legs bound with ropes. One or two men then hold down its head while the operation is being performed. Sometimes the branding iron is furnished with two or three teeth.

Trade in cattle.—From all accounts obtained locally, the trade in cattle has considerably declined of late years, owing to the great mortality which prevails among them at certain seasons of the year. A number of cattle, however, are still driven from the pasture lands on the coast *viâ* Midnapore to Ulubaria in the district of Howrah, where they find a ready market. Local *háts* are held in different parts of the district for the sale of cattle, among which may be mentioned the *hát* at Ichapur near the subdivisional town of Kendrapara, and the *hát* near Tanghi on the High Level Canal. Cattle are brought to these *háts* by cultivators, where they are sold to Muhammadan dealers, who either themselves march off the animals to the vicinity of Calcutta, or leave this to be done by wealthier mahajans to whom they sell at a profit.

Colour of the skin of cattle.—Professor Wallace of the Edinburgh University, after a very short tour in this country, started the theory in his "India in 1887" that the colour of the skin of Indian cattle is black. As might have been expected, the correctness of this statement was challenged by those who have had the advantage of a longer residence here. Mr. Steel of Bombay and Mr. Benson of Madras gave it as their opinion, that the colour of the hide was in many instances much lighter. Under the instructions of the Director of the Bengal Agricultural Department, I made several observations in the district of Cuttack, from which I may safely conclude that the colour of the skin of cattle here is not black all over. It was generally observed by me that those parts which were more exposed to the sun were black, while the stomach, the lower part of the ribs, and other parts of the body less exposed were of a lighter colour, varying from white to brown or white to dark grey. Another interesting observation made by me was that in very young calves, *i.e.*, from three to six months old, the skin about four inches downwards from each side of the back-bone was of a dull reddish-brown colour, while lower down it was found to get lighter, until the under portion of the ribs presented a beautiful rosy-coloured hue. Larger calves had a darker skin. All these observations support the idea, as is the case with human beings, that cattle are not always born with black skins, but, on the other hand, get dark-skinned with age and as they get exposed to the sun.

With regard to the physiological importance of these observations, no definite conclusions can be drawn other than the analogy from human subjects that there is no reason to say that the black-skinned cattle of India cannot cross with advantage with the white-skinned cattle of Europe. Instances are known, on the contrary, where such cross-breds have been established, and where they have been found superior to the small native cattle of this country. Other considerations, such as those of feeding and housing, the size of the animals, &c., certainly play an important part in all cross-breeding, but nothing need be said about them here.

Cattle diseases.—In the returns furnished by the Collector of Cuttack, the number of cattle reported to have died during the year ending 31st December 1890 from different diseases was as follows:—

Subdivision or thana.	NUMBER OF CATTLE DIED—	
	During the half-year ending 30th June 1890.	During the half-year ending 31st December 1890.
Cuttack	1,142	1,077
Salipur	1,820	38
Jagatsingpur	90	...
Tirtol	1,960	...
Banki	2,387	1,389
Jajpur	514	560
Dharamsala	959	614
Kendrapara	1,348	...
Patamundi	597	...
Aul	113	1,792
Total	10,930	5,470

It will be observed from the above statement that the number reported to have died during one year is 16,400. As the number reported to have died is probably much less than the actual number, it is apparent that mortality from disease here is very great.

A second statement is now appended, which will show the mortality among cattle in the district of Cuttack, as compared with some of the other districts in Bengal, for the year 1890. The figures have been collated from returns furnished by Collectors:—

Cuttack	16,400	Sonthal Parganas	2,434
Midnapore	10,086	Hazaribagh	2,366
Nadia	9,661	Birbhum	2,189
Rangpur	9,111	Darbhanga	2,052
Manbhum	8,496	Monghyr	2,041
Jessore	7,881	Puri	1,594
Khulna	7,262	Murshidabad	1,330
Lohardaga	6,557	Malda	1,180
Purnea	6,094	Jalpaiguri	1,013
24-Parganas	5,946	Saran	857
Balasore	4,713	Singhbhum	831
Burdwan	4,196	Faridpur	628
Dinajpur	3,969	Hooghly	543
Mymensingh	3,913	Howrah	528
Gaya	3,671	Patna	515
Champaran	3,442	Tippera	476
Bhagalpur	3,438	Noakhali	458
Bankura	3,276	Muzaffarpur	456
Rajshahi	2,846	Shahabad	350
Pabna	2,822	Chittagong Hill Tracts	289
Backergunge	2,744	Chittagong	188
Dacca	2,581		

From the above it will be seen that the mortality in Cuttack is absolutely higher than that of any other part of Bengal, but as returns of no kind are available giving the number of cattle in each district, nothing is known of the percentage of cattle dying every year.

The two epidemics most prevalent in Cuttack are rinderpest and foot-and-mouth disease. They have their own local names, and are described below with a few other diseases which also attack the cattle of the district:—

(1) *Thakurani.*—This disease is so called because it comes as a visitation from Divinity. It is a great sin to avert the calamity by taking any curative measures to keep cattle from dying off under its influence. Such being the general belief of the Uryas, very few take the trouble to try any remedies. Among veterinarians, the epidemic is better known as rinderpest, and it was identified as such by the Cattle Plague Commissioners in 1890, who gave it

as their opinion that *basanta*, by which name it is also known in Cuttack, is a true form of rinderpest. It attacks cattle almost in all seasons of the year, but causes the greatest mortality generally during the hot weather. Sometimes it takes a very severe form in winter. It is characterized by fever and excessive purging, and is often accompanied by cutaneous eruptions all over the body, on account of which it is considered to be *guti* or cow-pox. In this connection, it should, however, be remembered that the pustular eruption is a characteristic symptom of cow-pox, whereas rinderpest very often shows no sings of eruptions whatever. The disease is undoubtedly induced by a micro-organism which, as in anthrax, causes a morbid state of the blood. It has a period of incubation, varying from two to four and even eight days, after which it displays certain symptoms and runs a definite course until the animal dies. Being of a contagious nature, and containing a specific poison, this specific poison or *virus* may be transmitted by several *media*, such as straw, grass, cloth, skin, insects, worms, &c., and to this may be attributed the easy spread of the contagion in this country, where no measures whatever are taken to prevent the *virus* of the dead animal being carried into the villages. The carcass is carried to the *bhagar* when the animal dies in the homestead, and when in the fields it is allowed to be where the animal succumbs. It becomes the food of dogs and jackals, which carry the germs of infection into the village. *Chamars* take possession of the skins, and thus contagion is allowed to spread. No attempt is made at segregation when the animals are attacked, and the disease is thus rapidly allowed to spread from one animal to another, and from one village to another.

Symptoms of rinderpest.—The symptoms as observed by the raiyats are dullness, abstention from food and high fever at the commencement. The ears droop, the animal salivates, and there is a mucous discharge also from the eyes and nostrils. Though the animal is constipated at first, excessive purging sets in at the later stages till the animal dies. The *fæces* has a most offensive odour, and is generally covered with blood; eruptions on the skin are also noticed, but not always. When the animal survives the sixth day, the raiyats look forward to recovery.

Treatment.—As has been already remarked, practically nothing whatever is done to cure or prevent the disease. The raiyats are perhaps not far from the truth in holding that the disease is irremediable, but much may be done to mitigate the annual loss of animals if they were to adopt the ordinary prophylactic measure of isolating the unhealthy animals. Sometimes an offering of gram and other edibles is tendered to the goddess *Thakurani* to appease her wrath.

(2) *Phatua.*—Like the foregoing, this is also a contagious fever which affects cattle, as well as sheep and goats. It is characterized by vesicular eruptions upon the mucous membranes and upon certain parts of the skin. The parts most frequently attacked are the mouth, feet, udder and teats. The vesicles vary in size from a small nut to several inches in length. From the above description, it will be seen that the disease is the foot-and-mouth distemper of Europe. When the mouth alone is attacked, it is also known as *chowa.*

Symptoms.—The animal has a sore tongue and mouth and refuses food. The eyes become red, and saliva dribbles in large quantities. This is the case when the mouth alone is attacked. When the feet are also affected, lameness sets in, and blisters show themselves between and above the hoofs.

Treatment.—Oil expressed from *sissu* (*Dalbergia latifolia*) is warmed and rubbed over the sores. *Kuchila* (*Nux vomica*) boiled in water is also used as a wash.

Karandi fish (*Barbus phutinio*), the small *pungti* of Bengal, is fried and well ground and mixed with water, and then 4 chitaks of the mixture administered as a draught. This is regarded by many as a very effective cure.

As a rule, the number of deaths from foot-and-mouth disease is very small, as the animals naturally recover after the bursting of the blisters.

(3) *Sahana* or *habura.*—This disease is as fatal in its effects as rinderpest, being considered irremediable by the raiyats.

Symptoms.—There are swellings about the mouth and throat. Fever sets in, the nose begins to run, and saliva dribbles from the mouth. The whole frame of the animal trembles, until it falls down dead.

Treatment.—As soon as the first symptoms set in, some raiyats give the animal fowls' eggs, beaten up in a raw condition, and gently heated with chillies in one chitak of ghee, but the medicine does not appear to have any effect whatever.

(4) *Bát* or rheumatism.—*Bát* attacks calves as well as cattle, which being badly housed get exposed to cold and damp, by which the joints, tendons, and ligaments get inflamed.

Symptoms.—The only visible signs are lameness and a swelling of the joints. The temperature of the animal is raised, and there is generally some degree of costiveness.

Treatment.—(*a*) The bark of the *ashata* (*Ficus religiosa*) is boiled in a small quantity of water with the *aruk* or *arkha* flower (*Calatropis gigantea*) and *atab* (*arua*) rice. The mixture, when attaining sufficient consistency, is ground down, and with some more water it is converted into a draught, and given at intervals of two days in quantities varying from 4 chitaks for a calf to 12 or 16 chitaks for a full-grown animal.

(*b*) The pulp of a ripe cocoanut is reduced to a powder and mixed with *bargati (?)* and *arua* rice. The mixture is kept for eight days, and then to it is added parched rice and *dahi*, which is given twice a month while the rheumatic pains last.

(*c*) The roots of the *harisankar (?)* are ground down with *dahi* (1¼ powah of the powder with 1¼ seer of *dahi*), and the mixture given twice or thrice a month.

(5) *Pettana.*—The symptoms taken note of are—The bowels get constipated, the animal becomes very restless, and leaves off eating altogether, and the stomach swells. From these it would appear that the disease corresponds to hoven or tympanitis, which is the result of indigestion by engorgement. The remedies applied by the cultivators generally take good effect, so that very many animals are cured. The following were mentioned to me as being very effective:—

(*a*) *Dhatura* leaf (*Datura fastuosa*) ground down and mixed in equal proportions with *dahi*, and given in single doses daily for two or three days.

(*b*) Raw ginger, 1 powah, salt 1 chitak, and *dahi* ½ seer, well mixed together, and given in single doses.

(6) *Khasi* or cough or husk in young cattle.—The cultivators use the following recipés:—

(*a*) *Harbhanga* (*Cissus quadrangularis*) and mustard seed pounded together with water, and given in doses of 4 chitaks to each animal.

(*b*) The fruit of the *bhalia* (*Semecarpus anacardium*) is reduced to a powder and cooked in 2 chitaks of ghee, and given as a ball.

(*c*) Half a seer of *ajwain* (*Carum copticum*) mixed with an equal quantity of *gur*, and given at the rate of ½ seer per day.

(7) *Dudguma* or diarrhœa in calves.—Purging, as the name of the disease would signify, is due to calves surfeiting themselves with milk.

Symptoms and treatment.—The fœcal matter is fluid or semi-fluid, and generally of a dirty colour, though without any offensive odour. If this condition continues long, the animals lose flesh. But as a rule they are generally cured. The following remedy is found speedily effective:—Salt (¼ chitak) and mustard seed (¼ chitak) are mixed together and heated in a closed vessel until reduced to ashes. The mixture is then ground down with 2 chitaks of *ghol-dahi* (butter-milk), and given to the animals twice a day, morning and evening. In two or three days they usually recover.

(8) *Peruimora* or colic.—Colic is brought on by improper food, and more frequently by exhaustion from overwork, accompanied by long fasting.

Symptoms.—The animal has sudden pain, when it becomes restless, kicks at the belly, looks round at the flanks, and when the pain is acute it lies down, rolls about and struggles in many ways until it is free from pain.

Treatment.—The animals are branded with a hot piece of iron round about the seat of pain, and a drench administered, which is prepared by grinding together small quantities of chillies, ajwain, salt, turmeric, and *jabkhar* (prepared by the barber or Bhandari caste), and then boiling the mixture in half a seer of water for about half an hour.

(9) *Golafula.*—This term in Cuttack is generally applied to the non-anthracoid form of sorethroat. The temperature of the animal is slightly raised, and the irritation in the throat prevents its eating. It soon recovers, when the throat is fomented, and then touched externally with the *sonari* (*Cassia fistula*) fruit heated over a fire.

(10) *Benga.*—This disease corresponds to a mild form of laryngitis.

Symptoms.—The animal becomes very quiet, finds it difficult to breathe and ceases to eat. The epiglottis is slightly inflamed, and there is a slight febrile disturbance.

Treatment.—Mustard seed is well ground with water and allowed to stand over night. A chitak of this is then rammed down the throat followed by a chitak of salt, and rubbed over the inflamed parts. A wick made of cloth, dipped in *ghi* and heated over a fire, is used after this to touch up the inflamed parts. The diet until the animal recovers, which it generally does after two or three days, consists of warm gruel and fresh green grass.

The above are among the commonest cattle diseases prevalent in the district. Snake-bites add also to the mortality of the animals. When an animal is bitten by a snake, the raiyats thrash the animal with branches of the *arka* (*Calatropis gigantea*) and the thorny *kontaikuli* (*Zizyphus napica*) with the object of thrusting out the poison. The left ear is cut to allow the bad blood to ooze out. After the operation, the animal is made to take a draught prepared by mixing pounded turmeric and *dhatura* with water. A number of animals also die from the effects of poison surreptitiously administered to them by low-caste men, such as *Pans* and *Haris*, who get the benefit of the hides and horns of the animals, for which it is said large sums of money are advanced by Muhammadan dealers and traders. The poisons administered are believed to be arsenic and strychnine.

Dairy Produce.

The dairy products of the district consist of—

(1) Dud (milk).
(2) Dahi—
    (*a*) Ghol dahi (butter-milk).
    (*b*) Basa dahi (tyre).
(3) Sara (fermented milk).
(4) Nani or makkan (butter) made from *sara* or *basa dahi.*
(5) Ghi (clarified butter) made from *sara* or *nani.*
(6) Chhana (dudchhana and dahichhana).
(7) Rabbri (thickened milk).

Milk.—The quantity of milk given by an ordinary cow varies from half a seer to two seers per diem. Cross-breds give a little more. Buffaloes yield the largest quantity, often as much as three seers or even more per day, but their average varies from one to two-and-a-half seers. The milk of buffaloes is also of the richest quality, while there is hardly any difference in quality between the milk of a cross-bred and an indigenous cow. The largest number of milking animals is kept along the coast, especially in the Kujang estate, where unadulterated *ghi* of a very superior quality is available. The price of milk varies from 10 seers to 16 seers per rupee.

Dahi.—*Basa dahi* is produced by adding an acid to milk, and when this is churned, and the butter globules all removed, what is left is known as *ghol dahi.* The latter is considered a very cooling drink, and is largely taken by the cultivators, costing only about a pice a seer. *Basa dahi* sells in the market at the rate of 32 seers per rupee.

Sara.—Cows are milked by men or women, both in the morning and evening, either in the field or in the homestead. The milk, as it is taken from the cow, is received in a small earthen vessel (*taki*) or in a bell-metal cup (*kasa lota*). It is then poured through a straining cloth (*saphi*) into a larger earthen pan or *handia,* which is placed on a moderate fire and heated. While boiling, it is stirred with a *danka* (a cocoanut shell spoon costing half a pice). When the fat globules are beginning to show themselves on the surface, and when the milk in the pan has been reduced to three-fourths of its volume in the case of good milk, and to half its volume when the milk has been mixed with water, the pan is removed by the hand, and placed by the side of the *chula* or furnace on the *tangra* (*i.e.*, a small hollow made in the ground, where the vessel can rest without fear of its spilling over). Here the fermentation takes place. It is then removed into *dahi handis* in which it is to be set. When there is not enough milk, three or four days' milk when thus prepared is put into the vessel to be set with an acid. After being set, it is churned for butter. Sometimes, instead of being set with *dahi*, the cream as it forms on the surface of the *sara* is removed daily and then subsequently churned into butter.

Butter.—The *butter-churn* of Cuttack consists of a strong earthen vessel and a solid wooden rod, to the end of which is attached a circular solid board, which is worked either with the hand or with string, as is usually done in Bengal.

The earthen vessel in which the churning is done is called in these parts the *mohana*, being a thick jar-shaped pot with a narrow neck and broad flattish base. The other important part of the instrument is the *khowah*, which is made up of the *phul* and the *sara*, the latter being the handle by which the *phul* is made to revolve. The *khowah* is attached by means of two straps to a post of the *gwalia's* house, the lower end dips into the churning jar, while midway between the straps another rope passing round the handle is pulled with the hands to give the rod a revolving motion.

A detailed description of each part of the instrument now follows:—

(1) *The mohana.*—A vessel of this kind churning 5 or 6 seers of milk is about 18 to 22 inches in height, having a mouth which is about 8 inches in diameter. It differs from the ordinary cooking *handi* in being made thicker and stronger. The cost of one of these is about 3 annas. Larger jars would be proportionately more costly.

(2) *The sara.*—The *sara* or handle differs in length. The price of one four feet long, which is about the usual length of the handle, is 2 pice. It is usually made of *pia sál* wood; but other kinds of wood are also used, such as *sál*, *sissu*, *asan*, and *giringa*. When none of these are available, a bamboo rod is made to do the work, though on account of its lightness it is not supposed to act as well.

(3) *The phul.*—This part of the instrument differs from the ordinary split bamboo of Bengal. It is a block of solid wood having an upper flat surface, a lower curved base, with a cylindrical fluted body attached to the lower end of the handle. It is made invariably of *nima* (*Melia azadirachta*) wood, which, being close-grained, is lasting, and is not affected by the action of acids. Other varieties of wood are liable to warp, and are believed by the raiyats to produce an inferior quality of butter. The price of a *phul* varies according to weight from two to six or eight annas—the average weight being about 2½ or 3 seers.

Mode of making butter.—Cows are milked morning and evening. The morning's milk, which is collected in an earthen vessel or brass *lota*, is emptied into a second earthen *handi*, and placed on the fire immediately after the milking. It is boiled until the *shar* or cream which forms on the surface is of a slightly golden hue. The vessel is now removed from the fire and allowed to cool. The evening milk is treated in exactly the same way, and when cool is mixed with the milk of the morning. The mixture is then set with *ghol dahi*, about one pice weight of the acid being considered sufficient for the fermentation of about 5 seers of milk. This amount always depends on the degree of sourness of the acid, as well as on the temperature, and therefore differs at different seasons of the year. Tamarind juice, mango and lemon juice are used when *ghol dahi* cannot be had. The earthen vessel containing the mixture is kept immersed in another vessel of water in the hot weather; but in the cold weather the only precaution taken is to protect the *dahi* from ants, rats, cats and other pests, the usual practice being to string up the *handis* to the roof of the house.

The butter is churned the day after setting the milk, the operation being commenced very early in the morning in the hot weather. Sometimes the milk is kept for two or three days before being set, but in this case the butter that is obtained is not of the best quality. No water is added to the *dahi* before churning, as is the practice in some places; but during the process, water is sprinkled from time to time, about half a seer sufficing for 5 seers of milk. In the cold weather, a little hot water is added, which, in the opinion of the *gwallas*, induces the production of good, thick, grainy butter. This precaution is not needed in the hot weather, when the temperature of canal, river or well-water is naturally suitable for churning and washing.

As soon as the butter begins to form, the strings and straps of the handle are removed, the *khowah* is held in a reclining position, and with the fingers, previously washed in clean water, the butter is scooped out from between the ridges and from the surface of the *phul* into the mass of butter-milk. It is then stirred with the fingers, and collected together in small masses, which are next removed on the palm of the hand, and placed in another earthen vessel containing water. The butter is finally introduced into still another vessel, in which it is converted into *ghi*. The raiyats say, that 16 chitaks of butter can be obtained from 10 seers of milk, but the churning done in my presence did not give on any occasion more than a chitak of butter per seer of milk. Most of the butter is converted into *ghi*, as the demand for butter is mainly confined to town, where it sells at the rate of 16 chitaks per rupee.

Butter, besides being made from *sara* or milk set with an acid, is also obtained from fresh unboiled milk or milk that has been scalded. It is then known as *mhita* (sweet) *nani* to distinguish it from *khatta* (sour) *nani*, which is prepared from soured milk. Scalded milk is used in preference to fresh unboiled milk for the manufacture of butter, although there is no religious prejudice on the part of the Uryas to use the latter, as is the case in some parts of Bengal.

The *gwallas* fully understand that cleanliness is very necessary for success in dairying. Every vessel immediately after use is thoroughly washed, while some are not considered fit for use until heated on the fire.

Ghi.—The butter, whether obtained from cream or *dahi*, is melted by boiling it in a vessel as is done in other parts of Bengal. It is then strained through a piece of cloth into the vessel in which it is to be kept. The price of *ghi* in the district is one rupee per seer of 120 tolahs. In Kujang, it is the usual practice for mahajans to advance the money for the *ghi* to *gwallas*, which they take away in leather bags to Puri and other places where they sell at a profit, the rate for them being cheaper than that for other people.

Dudchhana.—Milk is placed in small earthen vessels (*gharis*), and then put on the fire to boil. While still hot, a little acid is introduced into the milk, *e.g.*, about a small spoonful of *dahi* or a little lemon juice. The vessel is then removed from the fire. In about 15 or 20 minutes the curd or *chhana* will be found to have separated from and to be floating within the whey or *chhana pani.*

Dahichhana—Is prepared by simply heating the *dahi* over a stove for about 15 minutes, and then allowing it to cool.

Rabbri.—This is prepared by boiling milk which, while on the fire, is kept constantly stirred by a *chattu* or wooden spoon until it thickens. In order to get the *khir* or thickened milk of a fine white colour, a little flour is added. In private houses arrowroot is used instead. When thick enough, it is removed and allowed to cool, when it is ready for sale.

Horses, ponies, sheep, goats, pigs, asses, poultry.

Horses and ponies.—There are no horses bred in the district. A few ponies are kept as hacks in town, and occasionally they are to be met with in the mufassal in the houses of zamindars and mahajans, or are found to belong, in isolated cases, to well-to-do raiyats. They are under-sized, and are not equal to much work. Horse flesh is generally brought from the Tributary States or purchased from the numerous up-country pilgrims who flock into the district on their way to Jagarnath and other sacred shrines.

Sheep.—The number of sheep in the district is comparatively small. Six or seven forms the usual number of a flock belonging to a poor low-caste man; larger flocks of twenty, thirty, and fifty are also to be met with, especially along the base of the hills on the western frontier. The latter generally belong to the lower caste of Hindus or to Muhammadans, who carry on a regular trade by bringing them for sale to butchers residing in the Sadar town. Such flocks are generally driven out to graze in the mornings, and after remaining out the whole day they are taken home at night, when they are housed in a shed separate from that intended for cattle. This precaution is taken as the urine of sheep, the raiyats say, affect the eyes of cattle. There is no objection, however, to pasturing sheep along with goats and cattle.

The indigenous sheep of the district are very small; but when fattened, they yield good mutton. No trouble whatever is taken to shear such animals. The price paid by the butcher varies from one rupee to three rupees, according to size. Larger sheep are sometimes brought in from the south, but their mutton is poorer and more coarse-grained than the Urya mutton. No care is taken to improve the local breed. The wool is short and of a rough texture. In the town of Cuttack, however, at Chasapara, there are about 350 Patna sheep reared by some up-country shepherds, natives of Gaya, who manufacture coarse blankets out of the wool which they sell at ten to twelve annas a piece. The height of this breed is two feet, *i.e.*, six or nine inches more than the Urya breed, and the staple of wool is about two-and-a-half inches long. The sheep are shorn twice a year, once in summer and then again at the close of the rains, each animal giving about two chitaks of wool at each shearing, or $\frac{1}{2}$℔ during the year. The shearing knife is shaped like a *sickle*, and is locally known as the *hansua*.

Goats.—Muhammadans are the chief breeders of goats. The ordinary breed is known as *deshi*, while a few larger animals with long ears found here and there belong to the *dakhini* breed. The meat of the Urya goat is fairly good, being superior to that of the larger *dakhini* goat, but the latter yields a larger quantity of milk. Like sheep, goats are pastured throughout the day and taken home at night to be kept under a covered shed. They are found very destructive to young jungle. It would be well, therefore, to regulate their pasturage grounds. When ready for the butcher, they are taken to Cuttack for sale. The price of a kid six months old is about Re. 1, of a yearling goat Re. 1-8, and of a full-sized animal about Rs. 3 or Rs. 4.

Pigs.—Pigs are only kept by the lowest castes, such as Pans and Haris. Large herds of them are kept in all parts of the district for purposes of trade, whereas a couple or more is owned and bred by every *ghusuria* (pigherd) on his own account. Pigs, like the rest of the farm-stock of Cuttack, are very diminutive. They are driven out to graze throughout the year, getting a dole of rice cleanings, rice water and other refuse once in the evenings. They are sold to low-caste men, chiefly Telingas, at prices varying from less than a rupee to three rupees each. The owners of pigs get a living also from cultivation and from making date palm-leaf mats of an inferior quality.

Asses.—Asses are very rare. A few are kept in town by washermen as beasts of burden, while in the interior one or two may occasionally be met with belonging to a troup of wandering gypsies.

Poultry.—Geese are seldom or never reared for sale. The few that are to be seen belong to private individuals. Ducks can be obtained from almost all Muhammadan villages. Fowls and eggs may be procured all over the district at rates slightly cheaper than those obtaining in Calcutta. They are kept by Muhammadans or by low-caste people, such as Pans, Kandaras, and Haris.

Improvement of live-stock.—Sir William Hunter has given it as his opinion that want of good cattle is one of the greatest impediments to better husbandry in India. All who have any knowledge of the agriculture of this country, and especially of Bengal, cannot fail to acquiesce in this opinion. The improvement of the live-stock of Bengal is a subject which demands the attention of all who take any interest in the economic condition of the country. It is almost useless to try and improve the agricultural practices of the country without first improving the strength of its draught cattle. To any one who has travelled through the districts of Bengal—and I would apply these remarks with peculiar force to the district of Cuttack—the causes of the degeneracy of local cattle must already be known. Everywhere is visible the work of the plough; and land under grass is a sight which rarely presents itself to the eye. There is no cultivation of fodder crops to compensate for the insufficiency of grass, and the means of the raiyat is such that he cannot afford to give any substantial artificial food. Cattle are left practically to their own resources, and have literally to starve during some months of the year. When to this insufficient food is added the hard work they have to perform in all tillage operations, their strength is necessarily diminished, and they are thus predisposed to all kinds of epidemics which from time to time cause such an enormous mortality among Indian stock. The owners of cattle must therefore be awakened to the necessity of better feeding their animals, before any improvement can be looked for in the present breed. Experience in the Burdwan and Sibpur farms has taught the lesson that, with good feeding and proper care, the very skeletons that now subsist in Bengal on paddy stubbles may be turned out hardy strong bulls which will be able to do as much work as the animals of any of the larger breeds to be found in other parts of India. The raiyat does not care for a large bullock to which he will have to give a very large quantity of food. What he requires rather is a strong bullock, which can give him more work than his half-starved one at present gives.

The practical suggestions which I would make with regard to better feeding, are the introduction of the cultivation of such fodder crops as *sorghum*, the formation of silo pits, and the formation of good pasture lands. *Sorghum* has given excellent results in the Burdwan farm, and grass has been successfully buried in silo pits in the same farm. I would therefore recommend the trial of the experiments in all the Wards' and Government estates of the district. With regard to the formation of better pasture lands, it may be noted that there was a time when jungle land was everywhere within the reach of cattle, which flourished well on the food they found for themselves, and furnished good plough and draught beasts for the raiyats. The area of such unoccupied land like grass land has of late years considerably diminished, and one of the main sources of food for cattle removed. What is distinctly a necessity is that certain tracts of forests should be reserved for grazing, and the animals of the raiyats ought to be allowed, at certain seasons when other food is scarce, to have admission into these reserved tracts.

CHAPTER IV.

LAND TENURE SYSTEM OF THE CUTTACK DISTRICT.

The following is the classification of the tenures existing in the district as adopted by Babu Ranga Lall Banerjee, whose special report on the subject has been condensed by Dr. Hunter in his Statistical Account of Cuttack. The land tenures met with are divided by him into three principal classes, viz.—

(A) Revenue-paying tenures.
(B) Rent-free tenures.
(C) Jagir or service tenures.

In order to give any clear statement of the exact rights, duties and privileges of the above tenure-holders, it will be necessary to give a short outline of their origin and then to trace the changes which have been introduced by the Moguls and Mahrattas, and lastly by the British administration.

Revenue system of the ancient Native Sovereigns of Orissa.—The native sovereigns of Orissa divided the territory under their control into several circles or local divisions, each of which was placed under two officers, respectively styled the *khandadhipati* and the *bhoimul*, the latter of whom was specially entrusted with the superintendence of the collection of the revenue.

1.—Samanta Rajas or border Chiefs of the Tributary Estates, No. 1.—The Tributary States, however, held by the *Samanta Rajas* or independent chieftains were exempted from the control of the above officers. These border Chiefs were chiefly the descendants of adventurers, perhaps Rajputs, who came from the North-West, and after driving before them the aboriginal inhabitants or conquering them, took possession of the mountain pastures which now skirt the western parts of the district. Some again were only the heirs of dependents, who had been granted extensive tracts of forest country as rewards for service rendered to their masters. All these Rajas merely established themselves as feudal lords, only acknowledging a kind of military allegiance to the *Sri Utkaleshwara Gajpati Maharaja* or sovereign power of the country.

In spite of their being out of the jurisdiction of the revenue officer, it seems, however, that these *Samanta Rajas* did pay tribute whenever there arose any necessity for the same, besides supplying military aid in times of war. Under Todar Mal, they were subjected to the payment of a fixed tribute. Later on, they suffered greatly under the cruel oppression of the Mahrattas, who made continual raids into their territory. Under British administration, they have once again recovered, and are now prospering as hereditary Rajas with semi-independent power under the superintendence of the Commissioner of the Orissa Division. It has recently been decided, that the Tributary Mahals of Orissa are not British territory, and the future politico-legal status of the mahals is under consideration of Government.

The following, taken from Babu Ranga Lall Banerjee's report, is a specimen of an agreement by a Gurjat Chief for his estate:—

Translation.

I, Ram Chunder Mohander Bahadoor, Raja of Killah Dhenkanal, in the Soobha of Orissa, engage faithfully and correctly to abide by this engagement entered into by me with the Honourable East India Company, as contained in the following clauses, to wit:

Clause I.—I will always hold myself in submission and loyal obedience to the Honourable East India Company aforesaid.

Clause II.—I will continue to pay without demur, to the said Government, as my annual *peshkush* or tribute, 23,125 *kahans* of *cowries*, in three instalments, as specified below.

Clause III.—I will, on demand to that effect, cause any person who is an inhabitant of the Soobha appertaining to the Honourable East India Company aforesaid, and who may have fled and come into my territory, to be forthwith arrested and delivered over to the Government.

Clause IV.—Should any person who is a resident in my territories commit a crime within the limits of the *Moghulbundee*, I hereby engage, on demand to that effect, to cause such person to be arrested and delivered over to the Government authority. Moreover, I further bind myself, in cases where I may possess any claim or demand on one who is an inhabitant of the *Moghulbundee*, not of my own authority, to enforce such claim; but I will notify the same to the constituted authority, and will act in accordance with such orders as may issue from him.

Clause V.—I engage that whenever the troops of the Honourable Company's Government shall pass through my territories, I will direct the people of my killah to supply, to the extent of their capability, all *russud* and supplies which shall be sold at fair prices. Further, I will in no manner of pretext whatever, ever stop, or detain, or offer any let or hindrance to any subject of the Honourable Company's Government, or to any other person whatever, who may be proceeding by land or water with goods or orders, or with any *perwannah* on the part of Government through my boundaries, and will rather take care that no loss or inconvenience shall befall such parties in life or goods.

Clause VI.—In case my neighbouring Raja, or any other person whatever, shall offer opposition to the said Government, I engage on demand, and without demur, to depute a contingent force of my own troops with the forces of the Government for the purpose of coercion and investigation, and the bringing of such recusant into subjection to the aforesaid Government, such contingent to receive only rations (or ration allowance) agreeably to the previously current practice, so long as they shall be present.

These shall be the instalments of my *peshkush* to be paid—

				Kahans.
In the month of	Cheyt	...	...	8,000
,, ,,	Jeith	...	...	8,000
,, ,,	Ashar	...	...	57,12
		Total	...	23,125

II.—Tributary Estates No. 2 *or Killahjats in the Moghulbundee.*—The number of these estates in Cuttack, as given by Dr. Hunter and Babu Ranga Lall

Banerjee, is eleven, viz.—Kanika, Aul, Kujang, Cheddra, Harishpur, Bishnupur, Sukinda, Madhupur, Darpan, Kalkala, and Dompara.

When the province was taken over by the British in 1803, it was found very difficult by the Commissioners to effect a settlement, as the Maharattas had done away with all important documentary evidence. Several parties actually in possession of lands styled themselves as *zamindars* or hereditary owners of the soil, and the Government accordingly recognized them as having a right to holding certain lands subject to the payment of a permanent sum. Regulation XII of 1805, while confirming the proclamation of the Commissioners in September 1804, laid down the rules for the settlement of the country, and we find in sections 33 and 34 of this Regulation that originally only eight of the above *killahs* were recognized as such by law, viz.—Darpan, Sukinda, Madhupur, Aul, Kujang, Harishpur, Bishnupur, and Kanika. Although the Chiefs of both these groups of estates were styled *zamindars*, *i.e.*, holders of estates permanently settled on a fixed tribute, there was a difference in their status, for whilst the Government revenue in the case of the eight killahs is styled *jama* or rent, that of the remaining three is called *peshkush* or quit-rent. Other similar differences were also recognized, for while the *zamindars* of Darpan, Sukinda, and Madhupur were given *sanads* or deeds of appointment, from the others regular engagements or *ikrarnamas* were taken and confirmed by the Governor-General in Council. Engagements were also taken from the three zamindars mentioned, but these were ordinary documents or *kabuliyats* in which the *zamindar* merely consented to pay the assessment of his estate and to submit to such conditions as any sovereign would demand from an ordinary subject. *Ikrarnamas*, on the other hand, were political documents in which the stipulations were similar to those in the engagements entered into with the holders of the non-regulation tributary estates. The following translations, which will be found in all accounts of the tenure of the Cuttack district, will illustrate the differences above described:—

(*a*) Translation of a *kabuliyat* executed by Dhrubji Bhubun Hari Chandan Mahapatra, Zamindar, Killah Sukinda.

"I, Dhrubji Bhubun Hari Chandan Mahapatra, zamindar of *killah* Sukinda, in the Province of Orissa, do execute this *kabuliyat* out of my full and free consent. That having been appointed to hold the service of zamindar in the *killah* by Government, I will collect the rents according to former rates, agreeably to the laws of the Government. That I will pay the annual revenue due to Government in the instalments specified below, without any excuse. That I will keep the raiyats prosperous and contented, and exert myself to improve the lands, so that they will bring forth more crops than they did before. That I will not allow an inch of cultivated land to fall waste. That I will never allow the growing of inferior crops in superior lands. That I will not be prodigal in my expenses, nor allow my raiyats to be so. That I will never grant any land in gift or *jagir* without a *sanad* of the Government. That I will keep a watchful eye over the boundaries of my *zamindari*. That I will vigilantly watch that no guns or swords, or any sort of offensive weapons are manufactured on my estate. That there will never occur any thefts or murders within the same. Should any robbery occur, I will trace out the offenders, and recover the property stolen, and send the thieves to the authorities. Accordingly I do hereby execute this *kabuliyat*, which will serve whenever it be required hereafter. *Jama peshkush* in perpetuity 5,500 *kahans*, to be paid in the following instalments at the rate of four *kahans* to the rupee:—In Phalgun, 1,000 *kahans;* in Chaitra, 1,500 *kahans;* in Baisakh, 1,500 *kahans;* and in Jaishth, 1,500 *kahans*."

(*b*) Translation of the *sanad* granted to the above estate—

"Be it known to the old and newly-created *chaudaris*, *kanungos*, *mukaddams*, *dalbeharas*, and raiyats of *killah* Sunkinda, in the Province of Orissa, that whereas Dhrubji Bhubun Hari Chandan is in possession of the said *killah* heretobefore, and therefore the *zamindari* of the said *killah* is granted and assigned to him by Government, you are hereby ordered to consider him as your *zamindar*, and never to wander from his lawful and salutary commands; you are never to conceal any matter from his knowledge; you will pay the rent to the *zamindar*, according to laws promulgated by Government, according to former rates and customs. The zamindar is to pay timely, by instalments, the annual revenue of 5,500 *kahans* of *cowries*, as fixed by Government. He is to keep the raiyats contented, that the productive powers of the lands may increase more than what it was before; that the zamindar will keep a watchful eye that no guns, swords, or offensive weapons be manufactured within the estate, and that there shall occur no robbery or murder; if such occur, he will arrest the thieves with the recovered property, and deliver all murderers to the authorities."

It should be noticed here that the hill Chiefs of Darpan, Sukinda, and Madhupur had, from *khandaits* or military owners of land, been converted by Regulation XII of 1805 into quiet proprietors of the soil. They had been accustomed to do military service and were responsible for all robberies committed within the *Moghulbundee* territory bordering on their own, and for this service they had been allowed to levy a tax called *chanpani*. When no military service was now required of them, this was commuted to a money payment by Government, *i.e.*, to the payment of a fixed *jama* in perpetuity. In such a position, these Rajas were not as independent as the *Killahdars* or Rajas of Aul, Kujang, Patia, Kanika, Harishpur, and Bishnupur, who were to pay only a *quit rent* in perpetuity.

Aul was created a *killah* by the Moghuls and given to a relative of the Raja of Orissa. The present Raja of Aul is a scion of the old family. Patia was in the same way given to a brother of the Raja together with Sybir. The ancestors of the present Rajas of Kujang and Kanika were barons of the land created by the *Gajapatis* of Orissa. Their estates were known as *Rajgi*, and they were styled Rajas from a very ancient period of time in the *ikrarnamas* taken from them by the Board of Commissioners. Tradition adds with regard to Kanika that the present Raja sprang from the Bhunj family. The Chiefs of Harishpur and Bishnupur were styled *Khandaits* (*i.e.*, *Khandapatis*), and not Rajas, in the engagements taken from them, although the stipulations were the same as those formed in the *ikrarnamas* of Kanika, Kujang, Aul, and Patia. But the status of the *killahs* on the seaboard has now greatly altered, most of them having changed hands by being sold for debts incurred by the dissolute habits of the *Killahdars*.

With regard to Kalkala, Cheddra, and Dompara, it may be mentioned that the first was formerly included in Darpan, but it was subsequently separated in July 1805, being held on the same terms as Darpan itself. Neither Cheddra nor Dompara were included in the lists of the Gurjats or Killahjats in sections 23, 24, 25, and 36 of Regulation XII of 1805. The *jama* of the latter was subsequently fixed in perpetuity, and an *ikrarnama* taken from the Raja. Cheddra was sold in 1836 for debts incurred by its dissolute *zamindar*.

III.—Zamindari States paying revenue direct to Government.—The denomination of *zamindar* was not introduced, as is often supposed, by the British when they took over the administration of the province, but was recognized by the Moghuls in Orissa long before this period, as would be evident from all royal mandates which were addressed "to the zamindars and *wahidadars*." When Orissa passed from her native sovereigns into the hands of the Moghuls, the original circles already referred to, *i.e.*, the *khands* and *besis*, became *parganas*, and the names *bisoi* and *bhoimul* were also gradually lost, giving rise to the then more familiar names of *chaudhari* or chief, and the *kanungo wilayti* or provincial *kanungo*. The portions of each *pargana* that came under the jurisdiction of the above officer were styled *talukas*, and the officers themselves were known as *talukdars*. When the Mahrattas came into power, the *Moghulbundee* was divided by them into four *chaklas* and one hundred and fifty *parganas*, and nearly every one of the latter was further subdivided with great uniformity into one, two, or more other classes of *taluks*, such as those bearing the names of *chaudhari*, *kanungo wilayti kanungo*, *sadar kanungo*, *mazkuri*, or *mukkadami mazkuri*. On the conquest thus of Cuttack by British arms, the *jamabandi* papers showed that most of the estates were allotments of *taluks;* only sixteen of them were entered as held by *zamindars* within the present limits of the Cuttack district, viz., Chausatipara, Rajendrapur, Paikrapur, Manpur, Gopinathpur, Alumgir, Aurungabad, Patamoondai, Kantajhar, Dalijora, Cuttack, Katayekotmul, Aurungmazurich, Kujang, Raghunathpersad, Padmanbhpur. The *taluks* have since been all converted into *zamindaris* by the British

Government, so that there is no distinction now in their rights and privileges. It should be noticed that this list did not include the *killahjats* or *peshkush mahals*, which were outside the regular Crown lands of the Moghulbundee.

In order to understand the rights and privileges of the zamindars thoroughly, it should here be mentioned that although the class of persons who were converted by the British into zamindars may have had but very little claim to the title of proprietor under the old fiscal administration, their rights as such cannot now be questioned. The zamindars of the whole province of Orissa are in every sense of the word the actual proprietors of the soil. Mr. Toynbee writes thus of them:—" The Commissioners therefore had no documentary evidence on which to base a settlement, or with which to rebut the claims of the parties actually in possession and styling themselves zamindars or hereditary owners of the soil. Thus a right which never existed was silently acquiesced in and indirectly admitted and confirmed by subsequent legislation. The proclamation issued by the Commissioners on 15th September 1804, and Regulation XII of 1805, which confirmed it, speak of the 'zamindars or other actual proprietors of the soil,' and the same phraseology is adopted in subsequent Regulations. In the accounts of the first English settlement, they are merely mentioned as holding certain lands, but in those of the triennial settlement of 1213—1215, the same individuals are spoken of as proprietors (*malik-i-zamin*), and have ever since been recognized as such." Mr. Stirling in his Minute states: " Regulation XII of 1805, though it does not say in so many words that the zamindars and talukdars are the actual proprietors of the soil, evidently designed to recognize them as such; and Mr. Ricketts is of the same opinion, as will be seen from the following extract taken from his letter dated the 20th October 1831: 'The persons admitted to engage were by this proclamation (*i.e.*, the proclamation of 1804), whatever they may previously have been, constituted proprietors of the lands contained in the estates and villages, the revenues of which they engaged to pay; to my comprehension it admits of no other construction.' According to all these authorities it will be seen, although there is much controversy on this point, that the zamindars of Orissa, like those of Bengal, are now entitled to proprietary rights. Their privileges and their responsibilities are similar to those of the proprietors of Bengal, as the Bengal Regulations were extended to Cuttack by Regulation XII of 1805. Instead of the permanent settlement, however, after several short settlements the province was settled for 33 years in 1836, and this settlement, which was extended for 30 years more in the year 1866, is still now in force.

The following, taken from the report of the tenure system of the Puri district, will show in a general way what the zamindars' rights now are in Cuttack:—

Rights and liabilities of zamindars—

(1) Absolutely hereditary sanction of Government to succession is not now required. No objection has ever been made by Government to give full effect to the succession of legal heirs, but, on the contrary, such succession has always been fully recognized by the courts of justice as well as by the Revenue officers.

(2) Perfectly transferable by sale, gift, or otherwise, so far as the State is concerned. Transfers by zamindars of the whole or portions of their zamindari have always been upheld by courts of law to be good, provided such transfers are not inconsistent with the national law of the transferer, and the Revenue officers have always given effect to such transfers either in the shape of mutation or *butwara*.

(3) The amount of revenue payable by each zamindar for his estate has been fixed permanently or for a certain number of years, accordingly as the *mahal* is permanently or temporarily settled, and the zamindar is not liable to pay anything above and beyond the stipulated amount of rent during the currency of settlement.

(4) In the *hustboodh* villages, *i.e.*, villages in which there is no intermediate tenure-holder between the zamindar and raiyats, the zamindar is entitled to all the increase of rent arising from whatever cause, except from *thani* lands and from lands over which a raiyat has rights of occupancy, if in the latter case the increase is due to the labour or expense of the raiyat. In the case of villages

in which there are intermediate tenures between the zamindar and the cultivators, all such profits go to the pocket of the tenure-holder, the zamindar being entitled only to the *malikana* allowed at the time of settlement.

(5) The zamindars cannot as of right demand remission of revenue in whole or in part in season of drought, inundation, or other calamity. The insertion of a clause in the zamindar's engagements, to the effect that in seasons of calamity, remissions will be given, was after deliberate consideration disallowed on the ground that the insertion of such a clause will be productive of endless embarassment, though at the same time it was said that it was to be understood that, on any great calamity occurring, suitable remissions should be granted (*vide* Commissioner to Board, No. 355, dated 2nd March 1838, and Board to Commissioner, No. 17, dated 9th March 1838).

(6) If in seasons of calamity the zamindars are not allowed remissions, they on their part are not bound by law to grant remissions to their raiyats and under-tenants, unless there is a provision to that effect in the leases of the raiyats. In the *pattas* granted by Mr. Wilkinson to the raiyats of Rahang Serai and Chaubiskud and in some other mahals, it is almost invariably provided that in seasons of calamity suitable remissions will be allowed. The allowance made to zamindars to cover risks and collection charges is in all such cases considered sufficient to provide against loss to them when there is a partial failure of crop or some other calamity of not very great magnitude.

(7) The waste lands attached to any village belong to the zamindars; but I believe this is subject to the prescriptive right of the villagers to pasturage, roads, an other public rights, though there are no express provisions to this effect to be found in the settlement proceedings.

(8) Since the passing of Regulation XII of 1805, the zamindars are not allowed to create under-tenures of a permanent nature.* In the event of the sale of an estate for arrears of revenue, the purchaser acquires it free from all encumbrances which may have been imposed upon it after settlement, and is entitled to avoid and annul all tenures which may have originated with the defaulter or his predecessor, as well as all agreements with raiyats subsequent to first settlement, saving always and except the following, viz. in the case of permanently-settled estate:—

* (*Vide* Government order No. 977, dated 29th March 1838.) If they do so, the tenure-holders will have no right to claim the recognition of their tenures when the parent estates come under revision.

(*a*) *Istimrari* or *mukarrari* tenures which have been held at a fixed rent from the time of the permanent settlement.

(*b*) Tenures existing at the time of settlement, which have not been held at a fixed rent: provided always that the rents of such tenures shall be liable to enhancement under any law for the time being in force for the enhancement of the rent of such tenures.

(*c*) *Talukdari* and other similar tenures created since the time of settlement and held immediately of proprietors of estates, and farms for terms of years so held, when such tenures and farms have been duly registered under the provisions of this Act.

(*d*) Leases of lands whereon dwelling-houses, manufactories, or other permanent buildings have been erected, or whereon gardens, plantations, tanks, wells, canals, places of worship, or burning or burying grounds have been made, or wherein mines have been sunk. And such a purchaser as is aforesaid is entitled to proceed in the manner prescribed by any law for the time being in force for the enhancement of the rent of any land coming within the fourth class of exceptions above made, if he can prove the same to have been held at what was originally an unfair rent, and if the same shall not have been held at a fixed rent, equal to the rent of good arable land, for a term exceeding twelve years, but not otherwise. Provided always that nothing in the above contained shall be construed or entitle any such purchaser as aforesaid to eject any raiyat having a right of occupancy at a fixed rent, or at a rent assessable according to fixed rules under the laws in force, or to enhance the rent of any such raiyat otherwise than in the manner prescribed by such laws, or otherwise than the former proprietor, irrespectively of all engagements made since the time of settlement, may have been entitled to do; (and in the case of temporarily settled estates) leases of lands whereon dwelling-houses, manufactories, or other permanent buildings have been erected, or whereon gardens, plantations, tanks, wells, canals, places of worship, burning or burying grounds have been made, or wherein mines have been sunk, which leases or engagements shall, so long as the land is duly appropriated to such purposes, and the stipulated rent paid, continue in force and effect. But the purchaser shall not be entitled to demand a higher rate of rent from any person whose tenure or agreement may be annulled as aforesaid, than as demandable by the former proprietor, except in cases in which such persons may have held their lands under engagements, stipulating for a lower rate of rent than would have been justly demandable for the land, or in cases in which it may be proved that, according to the custom of the *pargana*, *mauza*, or other local division, such persons are liable to be called upon for any new assessment or other demand not interdicted by the Regulations of Government (Act XI of 1859).

(9) In several cases in which allowances have been made to zamindars for the purpose in the settlement, they are bound to pay for the maintenance of village accountants (*patwaris*) and village watchmen (*chaukidars*), and where no such provision has been made, they are required to perform the duties of *patwari* (Regulation XII of 1817).

(10) They are prohibited from levying any kind of cess, or of receiving any money from their raiyats above and beyond the stipulated amount of rent (section 10 of Act X of 1859).

(11) For the recovery of arrears of revenue they are bound to proceed against their raiyats and under-tenants under the law in force for the time being (Acts X of 1859 and VI (B.C.) of 1862 now in force), and they are prohibited from adopting any other means of compulsion for enforcing payment of the rents due to them (section 11 of Act X of 1859).

(12) The *malikana* or proprietary share of the rent payable to the zamindar fixed at the time of settlement is not to be altered during the term of the settlement. Such *malikana* varies from 30 to 40 per cent. on the gross rental in the case of *hustboodh* villages, and from 7½ to 20 per cent. in the case of villages in which there are intermediate tenures.

(13) In case of default in the payment of revenue on the date fixed for payment, the estate is liable to be sold by public auction to the highest bidder, and the purchase money to be applied—

(*a*) to the liquidation of arrears due upon the latest day of payment;

(*b*) to the liquidation of all arrears due upon the latest day of payment from the estate sold, and the residue (if any) being then paid to the holder or holders of the estate (sections 3 and 21 of Act XI of 1859).

(14) A zamindar can purchase the rights of a *sikmidar* (such as a *mukadam*) in a village in his own zamindari, and enjoy both the *sikmi* and zamindari right, provided, of course, the *mukadami* is not of his own creation since 1805, it having been ruled that no zamindar has power to create a tenure since the enactment of Regulation XII of 1805.

(15) Under the laws now in force, the zamindars cannot be dispossessed of their estates so long as they pay regularly the amount of revenue fixed on their estates, and so long as the settlement is in force; but if at the time of revision of settlement, it should appear to the revenue authorities that the continuance or admission of the person who may have engaged for the revenue of the mahal, or who may claim to engage, would endanger the public tranquillity or otherwise be seriously detrimental, or if, under any other circumstances, they shall consider it inexpedient to take further engagements from him, they may, under the orders of Government, hold the estate *khas* or let it in farm for a period not exceeding twelve years (*vide* section 3 and clause 5, section 7, Regulation VII of 1822), and in such case the proprietor shall be entitled to *malikana* at such rate as the Board may consider, not being below 5 per cent. on the net amount realized by the Government from the lands, and not exceeding 10 per cent. on that amount without the special sanction of Government.

(16) Under section 45, Act X of 1882, the zamindars are bound to give information to the Magistrate or Police on certain criminal matters.

To give an account of one of these entire zamindaris, I cannot do better than quote in full an account of the history of Utikan, as given in Babu Ranga

Lall Banerjee's report, which by him was taken from the settlement papers of the estate:—

> "This estate originally belonged to one Nizamat Singh, upon whom the title of Raja was bestowed during the Moghul administration. In his time, pargana Sardola was amalgamated with Utikan, and both formed one estate: 12 villages were also taken from pargana Tikan and added to it. After his death, his son, Raja Bahadur Singh, was the zamindar, and he was succeeded by Bhaktiyar Singh. After him came Barkat Singh, and the last of the line was Saugram Singh. This man was ousted by the Mahrattas, and the estate was settled with Ramkrisna Deo of Aul. After a few years Saugram Singh was reinstated for a short time, but again driven out, and the estate was made over to Balbhadra Bhanj, Raja of Kanika. Again there was a change, and Saugram Singh was recalled to the zamindari, but only to be expelled afresh in favour of the Raja of Kanika, who held Utikan as a zamindari when the British took the province. The estate is now called Utikan Ugerah, being composed of two entire parganas and a portion of another. On the 20th January 1804, Balbhadra Bhanj gave a fresh *kabuliyat* to the authorities, but immediately after began to oppress the *mukadams*, *sarbarahkars* and cultivators. His oppression and extortions became so intolerable that on the complaint of the raiyats an *amin* was appointed to enquire into the matter, and the charges being proved, the Raja was arrested and imprisoned in Fort Barabati. On the 16th April 1805, under the authority of the Board of Commissioners, dated the 13th of November 1804, the Collector made a settlement with Saugram Singh, reinstating him in the domain of his forefathers. This was only for five years, for Balbhadra Bhanj, after his release, moved the Government for his restoration; and under orders of the Governor-General in Council, dated 12th May 1809, he was put in possession of the estate on the 30th August of that year, and Saugram Singh was deprived of his paternal acres for the fourth time. After the death of Balbhadra, the estate was registered in the name of his eldest son, Jagannath Bhanj, on the 12th June 1812. On the 3rd January 1817, it was divided with his younger brother, Harihar Bhanj, who received 7 annas 10 gandas of the property; but on the next day the whole estate was sold at Calcutta by the Board of Revenue for arrears of revenue. It was purchased by one Gopinath Roy Chaudhuri of Taki in Jessore. He was succeeded by his son, Prianath Rai, and his nephew, Kali Nath Roy Chaudhuri, who held it at the time of the last settlement. It is now in the hands of one of the most enlightened of Bengali zamindars, the Honourable Babu Digambar Mitra, and its market value has been raised to upwards of three lakhs of rupees."

A short account now follows of each of the defunct tenures above mentioned which have been converted by the British Government into zamindaris:—

(*a*) *Chaudhari Taluk.*—The *Chaudhari* who, under the Moghul and Mahratta Governments, was employed in managing and collecting the revenue, was really the hereditary revenue and police officer of the old Hindu Government bearing then another designation. Besides exercising revenue and police powers, he was also responsible for the revenue of the tract of country under his jurisdiction, and as compensation he was permitted to hold extensive rent-free lands, besides being granted a large number of perquisites in the shape of various fees and allowances. As has been mentioned elsewhere, the *Chaudhari* was also known by the name of *Khandadhipati.* His duties will be seen in the following *sanad* of appointment taken from the appendix to Mr. Stirling's excellent Minute on the tenures of Orissa, the original of which may be seen in the Commissioner's office:—

> "Let the *Mutsuddis* for future and present affairs attached to thana Talmal Kanika know that since the *khidmat* of the zamindari of Killah Mirichpur with that of mouzah Ruslo, attached to the above thana, in the Sirkar of Cuttack, has been assigned on the removal of Kripasindhu to Padmanabh Mangraj according to the *zamin* or endorsement, it is necessary that he pay his *peshkush* with regularity to Government, never failing a *dam* or *dirhem* into balance, perform with his contingent (jamet), protect the parganas of that quarter in such a way that there remain no traces of theft and robbery, keep the raiyats contented and prosperous, and abstain from levying unauthorized *abwabs*. You will consider him zamindar of the place, and act in all things with his advice in such a wise that the profit of the Sirkar and the property of the raiyat may go on daily increasing. Dated 10th Sraban, 20th year of the Jalus Mabarak, 1145 Amli. The seal contains the following:—Mahomed Shah Padsha Ghazee Fidwee Roostum Jung Moorshed Cooley Khan Bahadoor."

(*b*) *Taluk Sadar Kanungo.*—The Mahrattas divided the *Moghulbundee* into four *chaklas*, and in charge of each of these divisions was an officer called the *amil*, "who was individually responsible to the State for the revenue assessed on his division and for the general conduct and supervision of revenue, civil and criminal business. He was remunerated by grants of land called *nankar*, which he held rent-free, and besides this he was allowed, on adjustment of his accounts, certain perquisites and deductions on account of expenses of collection. Under him, as his chief assistant, was the *Sadar Kanungo*, who in his turn was assisted by a *gumashta* or *Wilaity Kanungo* in each pargana (*vide* Mr. Toynbee's Sketch of the History of Orissa, page 25). It would be evident, therefore, that this office was created at the era of the Moghul settlement, and to fill it, foreigners were brought from Bengal, who settled with their families in the province and transmitted it to their heirs for several generations, confirmed by the *sanads* of the ruling power. The Mahrattas, however, abolished the *Sadar Kanungos* in all but the name about 1198 Amli, since which period, although retaining considerable influence and some information, their *russoom* or perquisite had ceased, and they were recognized only as *talukdars* possessing extensive estates on the conquest of the province in 1803 A.D. (*vide* Sterling's Minute). Ranga Lall Banerjee says that the office of *Sadar Kanungo* in Orissa was abolished at the time of the permanent settlement in Bengal about 1189 Amli or 1792 A.D., by Raja Ram Pandit, and he adds that "they became the possessors of extensive zamindaris by advancing money to the defaulting talukdars on the security of the estates themselves."

The following is a *sanad* of appointment of a *Sadar Kanungo*:—

Sanad appointing a Sadar Kanungo, dated 41*st year of the reign of Arungzeb.*—Let the *mutsuddis* appointed for the management of affairs, the *gumashtas* of the jagirdars, the *kroris*, the *chaudharis*, *kanungos*, *mukadams*, and cultivators of the *Soobha* of Orissa know that since the *khidmat* of kanungos Sadar was held by Balbhadra according to the *sanad* of former rulers, he having at this time demised, the said office has been assigned to his son Rajendra according to the *zamin*. It is hereby ordered that you allow him to take possession of his office, and to enter upon the functions of it according to the established law and practice (*bootasurroof owa goozastite*); that you conduct all affairs relating to the revenues and civil administration of the country with his advice and concurrence; and that you attend on all occasions to his opinion and recommendations, which will have equally in view the interests of Government and of the cultivators. You will consider him to possess full powers of appointing and removing his *gumashtas*. The course to be pursued by the *kanungo* is this, that he discharge all the duties of his office with punctuality and fidelity; that he exert himself in promoting the cultivation of his *mahal* and in realizing the *peshkush*, &c.; that he ascertain fully the extent of the *mal*, *sayer* and all the various taxes, a regular statement of which, showing the *hakikut* of the whole *Soobha*, he must keep constantly in his *serishta*, and furnish yearly a copy to the *mutsuddis* of the Sirkar. Let him, by his equitable and judicious conduct, induce the raiyats to engage actively in cultivation; and considering his appointment as the highest honour, let him labour to the utmost for the advantage of the State. Herein fail not.

Dated 7th Rajub, in the 41st year of the Jalus.

(*c*) *Taluk Kanungo Wilayti and Taluk Kanungo.*—In the description of the last *taluk*, it has been pointed out that the *wilayti kanungo* was only an assistant or deputy of the *sadar kanungo* in each pargana, his office being also established in the time of the Muhammadan Government. Most of these deputies, who were also known as *gumashtas*, were, like their masters, of Bengali extraction, and each of these *gumashtas* had an Uriya sub-assistant or *muharrir*, known simply as *a kanungo*. On the latter class of people the bulk of the work fell, as they kept the accounts, made measurements, and furnished such information as was called for by their superiors. "They recorded all circumstances within their sphere which concerned landed property and the realization of the revenue, keeping registers of the value, tenure, extent and transfers of the lands, assisting in the measurements and survey of the lands, reporting deaths and succession of revenue-payers, and explaining, when required, local practices and public regulations. They were paid by rent-free lands and various allowances and perquisites. Like the *sadar kanungos*, they increased greatly in power, especially in the mufassal, so that in time they became owners of land in the place of *chaudharis* and other *talukdars* of Orissa, and their tenures were styled *taluks wilayti kanungo*, or simply *taluks kanungo*."

The following is a specimen of a *sanad* appointing a *wilayti kanungo*, taken from Mr. Sterling's Minute:—

"Let the *amils* for present and future affairs, the *chaudhari*, *kanungo*, *mukaddams*, raiyats and cultivators of pargana Byang, in Sirkar Bhadrak, know that since the *khidmat talukdari* of *mauza* Byang, &c., attached to the above pargana, has, on the removal of Sadanund Chaudhari and Kumar Nyak Mukadam, been restored and assigned as before, according to the *zamin* given to Muralidhur Harichundun, who is an excellent manager (*abadan kar khub*) and a punctual payee of the Government dues, he must in future discharge all the duties of his situation faithfully, pay regularly the revenue of the several villages *kist* by *kist*, keep the raiyats happy and contented, so exert himself that the signs of improving cultivation may be daily more and more perceptible, take care that *sirat* land shall not become *oftadeak*, nor inferior products be sown in the place of the more valuable ones, and should any theft or robbery occur, he will assist in tracing out the offenders and recovering the property; he will also abstain from levying prohibited *abwabs*. You will hereafter consider the above mentioned as confirmed *talukdar* and *kanungo wilayti* of the aforesaid place. Herein fail not.

Dated 19th of Sherzik and 1153 Amli."

(*d*) Besides the above, there were other *talukdars* whose rights and privileges were the same as those of the *Chaudhari talukdars*. Under the Mahrattas, we find that the *taluks* were named after the titles which were given by the Gajapati Rajas to the landholders created by them, which titles were as follow:—

1. Chhual Singh, a lion's cub.
2. Baliar Singh, a valiant lion.
3. Srichandan, (mild as) white sandal wood.
4. Patnaik, a chief lord.
5. Santra, a border chief.
6. Harichandun, (sweet as) yellow sandal wood.
7. Mahapatra, a great minister.
8. Roygura, royal preceptor (Brahman).
9. Sudhakar, receptacle of nectar (moon).
10. Bhatta, a chief pundit (Brahman).
11. Nisankra, fearless lord.
12. Pahraj, a chief among Brahmans (corruption of Prabhraja).
13. Narendra, lord of men.
14. Maratha, a great warrior.
15. Madanra, lovely as cupid.
16. Utsul Ranajit, an exalted conqueror.
17. Bara Panda, a great pundit in the Vedas.
18. Roy, a lord.
19. Mal-bahar, a great athlete.
20. Byriganjan, conqueror of enemies.
21. Bhumia, a landed proprietor.
22. Dandray, club-loving lord.
23. Dakhin Roy, lord of the south.
24. Beg, a chief.
25. Das, a servitor.
26. Mahanti, of great heart.

(*e*) *Taluk Mazkuri.*—Under the head of *taluka mazkuri* is specified in each pargana a number of small estates, the assessments of which were paid direct to the officers of Government, the term *mazkuri* meaning *specified* or *recorded*, and being applied to those estates which were thus allowed to engage direct with Government officers. Under this head are also comprised many of the lands called "*kharij baze ausamean*," and a large number of the *patna* estates, all of which are mentioned in the Mahratta *jamabandi* papers as bought.

(*f*) *Kharija mahals* or *patnas.*—The possessors of these lands had true proprietary rights to the soil. They in fact purchased the actual ground, generally free of rent, though it was sometimes stipulated to pay a light fixed assessment. The purchasers were of all classes, such as Bengalis, Muhammadans, Mahrattas, &c., who at first taking the land for building, planting out, or establishing a village, gradually added cultivation and converted their property into estates of vast extent. "Many of the *patnas* were formed by sirdars of the Moghul and Mahratta administration, which in course of time escheated to Government."

(*g*) *Mukadami.*—The headman of the village of the old Urya system was known as the *padhan* or *gramadhikari*. It was his duty to collect revenue on account of Government. When the Moghuls came into power, they styled him the *mukadam*, but there was a difference between the two tenures; for while the *padhan*, when dispossessed of the management of his village, retained no *padhani land* or *rasum*, the *mukadam* under the same circumstances had his hereditary rights always respected, and continued therefore to hold his *pitrala* or patrimonial property.

Dr. Hunter in his Statistical Account of Cuttack notices two kinds of *mukadams*, viz.—

(1) *Mukadams* paying revenue through zamindars as intermediate tenure-holders, and

(2) *Mazkuri mukadams*, who formerly paid their revenue direct to the *amils* of the Mahratta Government. They gradually grew in importance, until it became a common practice with the *amils* to take engagements from them. Thus, we find they were recognised as proprietors and zamindars by the British Government. The *chaudhari* and *kanungo talukdar* seemed to have possessed

a certain power of creating the *mukadami* tenure by sale, and of confirming the right of the soil upon others, as would be evident from the following copy of a *sanad* given in Mr. Sterling's Minute:—

> "We, who are Gangaram, *gumashta* of the *sadar kanungo*, and Madan Mohanti, *gumashta* of Chakradhur Mahapatra, *chaudhari wilaity*, and Lachu Mohanti, and Cheytan Mohanti, *wilaity kanungo*, attached to pargana Sonehat, on the Sirkar of Remna under Chakla Bandar, Balasore, declare as follows:—Since the *mukadami* of *mauza* Bhimpura in the above pargana has been from ancient times held by the sons of Bandhu Nyak jointly, but lately Jagat Nyak, son of Kuruj Nyak, out of wickedness wanted to get possession of the whole village, in consequence whereof Nandhu Nyak complained to the Nawab, who issued a *parwana* in our names to adjust the matter, we have therefore divided the said *mukadami* into four shares, each of four annas, and assigned one to Puratun Nyak, one to Nandhu Nyak, one to Jagat Nyak, and one to Suki Nyak. Let the sharers each pay the *surbarah* of his share to the Hakim-ul-wakt, and Jogo Mohun Das, each will be *malik* of the *nafa* and *noksan* and of the *rasum* in his own division. This is given as a *sanad* of *mukadami*.
>
> Dated Ramazan, 1187 Amli."

(*h*) *Dogra mahals.*—The *Dogras* were yeomen (stick-holders) who were formerly paid by *jagirs*. Their lands, however, were afterwards resumed by the Mahrattas. They pay revenue direct to Government, so that they now occupy the same position as the zamindars of the district, and have been recognized by the Civil Court as *shikmi talukdars*.

IV.—Intermediate estates paying revenue through the zamindar.—(*a*) *Shikmi zamindaris.*—The holders of these estates pay the revenue through one principal zamindar, the estates themselves being portions of *dogra mahals* or zamindaris subdivided among several sharers.

(*b*) *Mukadamis.*—These *mukadamis* or intermediate tenure-holders are descended from three classes of village proprietors in Cuttack, viz., the *maurusi*, *kharidadar*, and the *zati mukadams*. All questions regarding the interests of the village community used to be settled by them, but this power has gradually been lost under British rule.

(*c*) *Sarbarahkari.*—This was never considered before as a landed tenure. A decision of the Supreme Court in 1859 showed that the *sarbarahkars* are no true proprietors of the soil, for though allowed a percentage on account of collection charges, they never had the *malikana* or proprietary allowance paid to them. They originally were mere village accountants or managers and have now become intermediate tenure-holders, with a status in the mufassal equal to that of *mukadams*. In fact in a *sarbarahkari* village the privileges and rights far exceed that of the zamindar, who only gets his percentage and that of Government from the *sarbarahkar*.

The following decision arrived at by Government will illustrate the main incidents of the tenure:—

1*st.*—That the *sarbarahkari* tenure be recognized as one of the existing under-tenures of Cuttack.

2*nd.*—That the Collector at the time of making a settlement must, as in the case of *mukadams*, fix the share of the existing rental to be allowed to a *sarbarahkar*, and the amount payable by him for the village under his management to the zamindar.

3*rd.*—That if a *sarbarahkari* tenure be found at the time of settlement in the possession of several joint *sarbarahkars*, the Collector, with the concurrence of the zamindar, may select one or more of the body to be the recorded managers of the *sarbarahkari*.

4*th.*—That *sarbarahkars* so selected and recorded cannot be ousted from their tenures, except for default of payment of rent, or for mismanagement proved to the satisfaction of the Collector.

5*th.*—That the tenures should never be admitted at the time of settlement as hereditary property, unless they have been held as such uninterruptedly from a period antecedent to the British accession, *i.e.*, antecedent to 14th October 1803, and unless the claimant be in possession of the tenure at the time, or within a year previous to the time of settlement.

6*th.*—That in cases in which hereditary succession or interrupted occupation cannot be shown, but the claimant himself has been long in possession, and is in possession at the time of settlement, the Collector may, in consideration of occupancy, according to its duration and circumstances, propose a temporary admission of the tenures for such term, and on such condition, as the case may seem to require.

7th.—That no admitted *sarbarahkari* tenure, hereditary or temporary, can be subdivided without the consent of the zamindar.

(*d*) *Kharija jamabandi.*—These are of the same nature as the *kharija estates* mentioned already, the only difference being that they pay the revenue through the zamindars.

(*e*) *Pradhani tenure.*—This is a remnant of an old tenure created during the Hindu period. In fact, it is one of those extant tenures which seem to have existed prior to the oldest recorded accounts, the other revenue-paying tenures created at the same time being the *pursethi*, the *thani*, and the *pahi* holdings.

The padhan was the headman, a chief of the village of the old Urya system. Mr. Sterling, in his Minute, says: "The *padhans* and *bhooees*, or heads of villages and accountants, have been always considered from the beginning as mere officers of the Raja, depending on his will and pleasure, though for the most part succeeding hereditarily to their offices;" and Mr. Groeme, in his report on the settlement for 1212 Amli, observes: "The *padhans* received from the former Government (*i.e.*, from the Raja) one bigha of land in twenty for superintending the collection of the revenue." The *padhans* are nowhere noticed, therefore, as having proprietary right to the soil, excepting their *vitta padhani* or service lands, but they had the right of management, which right they could sell, as would be evident from the following extract on a deed of sale:—"We *padhans* sell to you our *padhani* or right of management (*huk-i-serberah*) in the whole of the said village............ You will hold the *padhani* as long as the sun, moon, and earth last. Should any *sawunt* or chief or our heirs or any other claimants advance a claim, we will be responsible; so long also you will enjoy the *vitta padhani* or service lands which we have sold with everything above and beneath,—water, dry land, mineral productions, wells, wood, stones, fruit trees, &c."

In addition to the above, it appears from Mr. Wilkinson's report, 1837, that the *padhans* further received a small fee per bigha from the villagers when their crops had reached maturity. Under the British rule they have been recognized as landlords.

(*f*) *Pursethi tenure.*—This tenure had the same status as the *padhani*, the word meaning "*chief of the town.*"

Under the Moghul revenue administration, the majority of both *padhans* and *pursethis* became *mukadams.*

V.—Resumed revenue-free teuures.—There are three classes of tenures under this head, viz., resumed *lakhiraj* tenures, resumed *jagir* tenures, and resumed *nankar* tenures. All these originally implied grants for holding land exempt from payment of revenue, but at the time of settlement, the *sanads* under which they were held being considered non-valid or non-genuine, they were adjudged as liable to the payment of revenue, in consequence of which, light rental was imposed on them. But this light assessment is not conferred in perpetuity, the amount paid by these resumed tenure-holders being liable to vary at each resettlement of the pargana in which these lands are situated.

The *lakhiraj* and *jagirs* were assessed with half rental. The *nankars* comprising lands "which were formerly assigned by direct grant of the ruling power to certain *zamindars*, *talukdars* and *mukadams* for their own special cultivation for the support of their families, have all been resumed and a light tax assessed on them."

VI.—Quit-rent tenures.—Under this head are two kinds of estates, viz., *Aima* and *Tanki.*

(*a*) *Aima* tenures are old *quit-rent* tenures, the land subject to such rent having been granted by the Moghul Government to "learned and religious persons of the Muhammadan faith, or for religious and charitable uses in relation to Muhammadanism." These have been recognized by the British Government as hereditary and transferable.

(*b*) *Tanki tenures.*—These tenures during the Hindu period were originally held rent-free, consisting, as the case may be, of entire villages or only of small plots of ground measuring only a few acres. As the Hindu Rajas, however, began to be invaded by foreign powers, they began to levy for their support a small *quit-rent* on all such lands, and these *quit-rents* were continued by the Moghuls. Under their administration, we find that *tanki land* was land subject to a *quit-rent* of one rupee per 20 *máns* of land and attached as a perquisite to the office of *sadar kanungo* and other favoured officers.

VII.—Cultivating tenures.—The general body of the cultivators of the district may be divided into two large classes, viz., *Thani* and *Pahi.*

(*a*) *Thani* is a corruption of the Sanskrit word "Sthaniya," *i.e.* resident, and is an epithet applied to all resident cultivators in contradistinction to the non-resident or *pahi* raiyats. Mr. Ricketts, as would appear from his letter dated the 20th October 1831, was of opinion that they could be called the actual proprietors of the soil, as they were for generations the uninterrupted possessors of land; but such possession under the present law can confer no proprietary right in the soil, all that can be claimed being the right of occupancy, and this is exactly the present status of a *thani* raiyat. He has a hereditary right of occupancy in his lands, and his tenure is not transferable. This is borne out by the opinion of officers connected with the settlement of other parts of the province. Mr. Wilkinson writes in 1821:—"The raiyats of Khurda, as far as I have been able to ascertain, appear to possess no right but that of occupancy so long as they pay the rent demanded from them, nor have they preferred to me any other claim;" and after further experience he again says in 1823:—"As well as I am able to judge, the raiyats appear to possess no privileges but that of possession so long as they pay the Government demand, nor have any other claims been preferred to me." Again, in connection with the settlement of Delang, he confirms his previous views thus:—"Respecting the rights and privileges possessed by *thani* raiyats, I agree with Mr. Forrester that they have none but that of occupancy so long as they paid the rent demanded of them. It is to be observed also, that the rate of rent should be a fixed one during the currency of the settlement. In the time of the Moghuls, it was regulated by the settlement of Todar Mal, Akbar's minister, but the right of adding to it various cesses has been irregularly exercised. Ranga Lall Banerjee states there have been innumerable alterations in the *jama* of the *thani* raiyat ever since the last settlement, and that these alterations are enhancements in the shape of extra cesses. Not long after the British conquest, Mr. Melville reported from the province that "the only positive check to the exaction of the landholders is the apprehension of the depopulation of his estate by the flight of his tenants." But the zamindar entertains no such fear now. As Mr. Toynbee very tersely puts it—"The difficulty is now not where to find raiyats to till the soil, but where to find lands for the raiyats to cultivate," and nothing but the direst oppressions from the ravages of a severe famine can induce an Urya raiyat to desert his paternal fields. To what extent this abuse is carried on by the zamindars it is difficult to know. Suffice it to say, that in touring through the district, one does hear of such enhancements now, however much the evil may have decreased.

The following extract from Mr. Sterling's Minute will illustrate all the more clearly the status of the two classes of raiyats prior to the settlement of the province:—

> "In every village of respectable size throughout the Moghulbundee, two great classes of raiyats or tenants and cultivators of *malgoozaree* land are known: the *thani* or fixed residents, and the *pahi* or non-residents. The best lands of each village have been for ages divided out in fixed portions amongst the *thani* or *sthani* raiyats. They are in many parts bound to pay the rents of this portion annually, whether they cultivate the whole of it or not. They do not in general take out *pattas*, nor do they give *kabuliyats*, as they hold the lands under their *jot* or plough hereditarily, and the amount of their proper payments on account of rent depends on a measurement and adjustment of rates made long anterior to the present day by act of the sovereign. Such at least is the state of the case in regard to the most substantial and respectable part of the *thani* raiyats. *Pahis* are those who rent and tenant temporarily land not occupied by a *thani* (and which will be considered the property of the State or of the *mukadam* or *talukdar*, according to different views of the state of landed property under the native Government) in a village where they have no fixed habitation. These for the most part take out *pattas* and give *kabuliyats*, though verbal agreements are not uncommon where the contracting parties are well known to and have confidence in each

other. Summary claims for recovery of arrears from the *thani* raiyat, if ever preferred, are enforced by the production on oath of the *bhian* or papers which show the land tenanted, the rates and total payment of each raiyat; those against *pahis* are most frequently grounded on kabuliyats. As the *pahi* cultivates at his pleasure, and feels little reluctance in removing from a spot where he has taken up a merely temporary abode, he of course makes his own terms with the *mukadam* or *talukdar*, and pays a far lower rate than the tenant attached permanently to the soil. The difference between the *nirikh pahi* and the *nirikh thani* in favour of the former is too well known in this district. Besides the heavy regular rate charged on the *thani*, all impositions, contributions, and extra collections on account of *akrajat* are loaded upon him as long as he can bear them. The Government increase, for instance, since 1216 Amli is often levied from the resident cultivators in the shape of *ruqm* or *muthote*, so much in the rupee, called *izafeh sircar*. The *sewaee* collections made from the *pahi* are in general of trifling amount, and such as are admitted to be justly demandable. It naturally becomes a question, what are the advantages of the *thani* to compensate for the heavy burthens and impositions to which he is exposed. In the first place, there is the general one of having a home of his own, where his ancestors have dwelt in all ages; of sitting under the shade of the trees which they planted, and of bestowing his labours on land which may in one sense be called his own; rooted to the soil, he has a local habitation and a name, a character known to his neighbours, and a certain degree of credit thence resulting, which enables him to borrow from the mahajan, and secures to him a settled market for the disposal of his produce. Then, again, he is exempt from demand of *chandnia* or house-rent, and is allowed, besides, a small portion of rent-free *khanabari* land around his habitation as garden ground, where the trees which he plants are his own, though liable probably to be cut down or attached in payment of arrears; also a spot called *talmunda* to drop the rice seed into, previous to transplanting. A preference is given to him in cultivating the lands of the village *lakhirajdars*, when they do not themselves handle the plough, and his sons and brethren or even himself may cultivate untenanted land as *pahi* in their own or another village.

"I am not prepared to say exactly what period of residence entitles a *pahi* to become a *thani* (or I should say rather renders it obligatory on him to share the burthens of that class), whether all *pahis* must not be somewhere *thanis*, or whether there is a considerable class of sojourning husbandmen who move about frequently, cultivating only from year to year, or supposing the half of one village to desert to another, on what understood terms they are allowed to make a settlement, either now or under the old Government. There are, I believe, many small hamlets in this district of temporary construction inhabited solely by *pahis*, and there are numerous *uyrani* or *ghyr abadi mauzas* where the name only of village remains, but no inhabitants, the land being cultivated, if at all, by residents of the surrounding villages at the *pahi* rates. Mr. Forrester makes a curious observation on this subject in his report on the settlement of Limbai, dated 16th August 1819:—'It is said that the proportion of *pahi* raiyats has of late years very much increased, in consequence of the heavy *jamas* put on by Raja's farmers, many raiyats declining altogether to cultivate in their own village, and engaging only for lands in neighbouring villages where they can settle their terms before they begin to cultivate. This appears to me a very desirable alteration.' Such a proceeding, I would not imagine, in the greater part of the Moghulbandee, exempt them from payment of their established *jama*, or at least, should they refuse to liquidate this, they must pay house-rent and forfeit all their privileges as *thanis*.

"It appears to me a clearly established principle in Cuttack, and it is scarcely denied by any one whose notions of landed property have not been altogether newly modelled by the British laws and regulations, that the superior holder, whether *mukadam* or *talukdar*, has no shadow of a right to dispossess the *thani* raiyat from his land so long as he pays the rent demandable, and also that that rent was formerly fixed by Act of the Government on consideration of the quantity of soil tenanted by each, its produce and value in reference to which the zamindar's payments have been adjusted, and consequently that he has no title whatever to require an increase. The unprosperous state of the raiyats, however, for a long series of years must necessarily have introduced numerous alterations and fluctuations. Where a resident cultivator has broken down from misfortune or oppression, the zamindar must of course lower his rents temporarily, if he wishes to prevent his absconding or starving—a relief which would render him liable to an equivalent subsequent increase; and when a cultivator cannot or will not pay his rent, it has been at all times customary to make over temporarily his lands to any other person who may be willing to take charge of them. The interests of the raiyats are too little understood in Cuttack to enable me to say what period of recusance to cultivate or inability to pay would involve a final forfeiture of the title of fixed occupancy, supposing it could ever be the interest of the zamindar to impose such a penalty. With respect, too, to the payment of a fixed *jamabandi* or *quantum* of rent for the same quantity of land, the advantage is merely nominal, as the person who collects has long exercised the power of imposing additional burthens in a variety of shapes and names, which the raiyat cannot resist the payment of, and many of which become in the course of years consolidated with his established rates. The practice of dividing the crop is not common in this district, and seems rather to be shunned by the cultivator.

"As far as fixed hereditary occupancy of the soil independent of the will of another can convey a title, the thani raiyat of Cuttack may be considered in some sort a proprietor of land. But there is nothing like a distinct palpable and recognized right of property in the soil to be discovered on the part of the resident raiyats of Orissa, like the *meerassdars* of the Deccan or the village *zamindars* of the Upper Provinces. Neither is the general sense of the country in favour of such an hypothesis, nor do the raiyats themselves claim it. After the most careful inquiry, I have been unable to discover any instances of a raiyat selling or mortgaging his lands, nor can I meet with anyone who thinks they possess such a right, or is aware that such has ever been exercised in practice. It may still be said that this is not conclusive as to the original state of things. In latter times, the situation of the *thani* raiyat has become distinguished from that of others, not by its superior advantages, but by the greater share of suffering and exaction attaching to it. What a man is born to, he must put up with as long as he can; but no person would voluntarily enter upon a lot so unenviable and undesirable as that of the fixed resident cultivator. We see that class constantly breaking down all around, and the disposition on their part to change is not confined to Limbai. I myself know some *taluks* which have become ruined solely from the desertion of the *thani* raiyats, whilst *pahis* are to be had everywhere in abundance by allowing moderate terms."

The incidents of the *thani* raiyati tenures have been well briefly stated in the report of the tenure of the Puri district, and may well be reproduced here. They are:—

1st.— *Thani* raiyats have right of occupancy. The zamindar cannot turn them out of their lands so long as they pay their rent regularly. But if at the end of the year they remain in arrears, they are liable to be ejected, but not otherwise than in execution of a decree or order of the proper court, and not if the amount of decree is paid within fifteen days from the date of decree (*vide* sections 21 and 78 of Act X of 1856).

2nd.—The amount of rent payable by them (*thani* raiyats) is fixed and unalterable for the term of settlement. This is a condition in the lease granted to them. All profits arising out of improved or extended cultivation belong to them, and the landlord is not entitled to participate in the enjoyment of the same.

3rd.—The tenure is divisible amongst heirs (*vide* section 6, Act X of 1859), but the rent cannot be divided without the consent of the person entitled to it (section 27, Act X of 1859).

4th.—The tenure is not transferable. The raiyat has no right to transfer the whole or any portion of his tenure by sale, gift, or otherwise. The only exceptions to this general rule are the *thani* raiyats of the Government estate of Khurdah and Panchgarh, to whom the right of transfer has lately been conceded by Government order No. 2553, dated 17th December 1874, the Government having, however, as zamindar, reserved the right of re-entry.

5th.—The raiyats are at liberty to relinquish their lands, provided they give notice of their intention in writing to the person entitled to the rent of the land, or his authorized agent, in or before the month of Chaitra of the year preceding that in which this relinquishment is to have effect, otherwise they must be held responsible for the rent of the land for the ensuing year (section 19, Act X of 1859).

6th.—In case of flood, drought, or other calamity of season, they are not entitled to remission unless there is a provision to that effect in their leases. Such a provision is to be found in almost all leases granted to the raiyats in Rahang, Serai, Chaubiskud, and Limbai parganas.

7th.—In case of sale of the parent estate for arrears of revenue or other wise, these tenures are not vitiated thereby.

(*b*) *Pahi.*—From the quotation from Sterling's Minute given above, it will be seen that the term *pahi* is applied to non-resident raiyats, *i.e.*, those who do not reside in the village in which they cultivate, but in its vicinity (old Hindi *pakkho* or *pakkhi* = a side). They did not share the privileges or responsibilities of the *thani* cultivators, and being migratory husbandmen often abandoned their own fields to settle on estates which could be had at a lower rate of rent. As a rule, they had no house or homestead in the village, to which their fields were attached, but since the acquisition of the province they "have fixed their permanent homesteads in the villages of their adoption, and their long residence has given them the status of burgesses or citizens, although they pay rent for the ground upon which their houses are built, which the *thani* raiyats do not." Formerly they were merely tenants-at-will or in some cases were secured in their holding by special leases from the landholder, but under Act X of 1859 they have been divided into two classes, viz.—

1st.—Those having rights of occupancy, and
2nd.—Those having no rights of occupancy.

By section 6 of the above Act, "every raiyat who has cultivated or held land for a period of twelve years has a right of occupancy in the land so cultivated or held by him, whether it be held under *patta* or not, so long as he pays the rent payable on account of the same; but this rule does not apply to *khamar*, *nijjote*, or *sir* land belonging to the proprietor of the estate or tenure and let by him on lease for a term, or year by year, nor (as respects the actual cultivators) to lands sublet for a term, or year by year, by a raiyat having a right of occupancy." The rights, then, of *pahi* raiyats of the first class are the same as those of *thani* raiyats, with this exception, that while the amount payable by the *thani* raiyat cannot be enhanced during the period for which the settlement lasts, it being fixed for that period, that paid by the *pahi* raiyat is liable to be changed at any time. It may be enhanced—

Firstly.—If the rate of rent paid by such raiyat is below the prevailing rate payable by the same class of raiyats for land of similar description with similar advantages in the places adjacent.

Secondly.—If the value of the produce or the productive powers of the land have been increased otherwise than by the agency or at the expense of the raiyat.

Thirdly.—If the quantity of land held by the raiyat has been proved by measurement to be greater than the quantity for which rent has been previously paid by him (section 17, Act X of 1859).

It is also liable to abatement by section 18, Act X of 1859—

Firstly—If the land has been diminished by diluvion or otherwise.

Secondly—If the value of the produce or the productive powers of the land have been decreased by any cause beyond the power of the raiyat.

Thirdly—If the quantity of land held by the raiyat has been proved by measurement to be less than the quantity for which rent has been previously paid by him.

Pahi raiyats of the second class, *i.e.*, without occupancy rights, are, on the other hand, mere tenants-at-will, and so, according to section 8 of Act X of 1859, are not entitled to a *patta* until they can agree with their landlords as to the rate of rent, from which it will be seen that they can be ejected or have their rents raised at the landlord's pleasure. If they wish to remain in possession of their land, they must agree to the terms of their landlords. Their tenures, further, are not heritable, transferable, or divisible.

(*c*) *Chandnia raiyats.*—Besides the two large classes mentioned above, there is a third class of cultivators known as *chandnia* raiyats. *Chandnia* was the name given to the rent of the land on which a house is erected from which *thani* raiyats are exempt, but which *chandnia* raiyats had to pay. They are thus the class of raiyats who have only homesteads and garden lands, belonging generally to the *Teli* and other trading castes.

VIII.—Rent-free tenures.—These tenures may be subdivided into (i) religious or charitable tenures and (ii) *jagir* or service tenures.

(*i*) *Religious and charitable tenures.*—The grants under the first head are of different denominations, comprising lands which were given for religious and charitable purposes from the earliest Hindu period. They are also known as *lakhiraj* tenures, and must be distinguished from the *lakhiraj bajeafty* tenures, which comprised resumed *lakhiraj* lands. A description of each of these tenures now follows:—

(1) *Brahmottar.—Brahmottar* is the term applied to land granted either to individual Brahmans, or to a body of Brahmans forming a village, for their support. The holders have proprietary rights in their lands, and the *sanads* conferring the grants, which were usually drawn up on palm-leaf, show that they were given in perpetuity. In all of these, it may be noticed that though

the area of the land thus given is stated, the boundary is not defined. The *sanad*, which is to "remain valid so long as the sun and moon endure," contains a provision that the recipient of the land shall invoke blessings on the donor's name three times a day (*trikala sandhya ashirbad krau theba*), viz., morning, noon, and night. The following is a translation of a specimen of a *sanad* which I found in the settlement report of Killah Kujang :—

> "Sri Nursing's protection. Sri Raja Mardraj Biro Chandra Sendh Norindra Bahadoor Maharaja's greetings to Brahmin Daitari Das. Given this *Dana chope sanad* (or grant of land) on the 10th day of *mina auka* 1207 *Sâl* for 17-12-8 *biswas* of *Brahmottar* land in Paradip Srinar (killah or fort) to be enjoyed as a gift as long as the moon exists, and to be made use of by you, and for all time. You shall give your blessings three times a day, morning, noon, and night."

(2) *Debottar.—Debottar* lands may be subdivided into three classes, viz.—

(*a*) *Debottar*, *i.e.*, the land granted rent-free for the worship of the gods and goddesses, or for the maintenance of Hindu temples and idols. The tenures are heritable but not transferable. By the conditions of the endowment, the trustees and priests and other attendants have no right to alienate the lands attached to the endowment.

The following is a specimen of a *debottar* grant:—

> "I, Prandhur Mahanty, son of Hari Surn Mahanty, grandson of Jagarnath Mahanty, *Gumashta* of Gopendra Roy Mahasoy, *Kanungo Sadar*, do state that *mauza* Rainochna, &c., pargana Kokooakhand, Sirkar Cuttack, is my *jagir mahal*. Whereas there is no property assigned for the services of Govindajee, Thakur of Bazarpatpore, pargana Cuttack Havili; and whereas *baishnabs* and mendicants do always halt at the temple, but suffering from starvation they go away to other places, I hereby grant, of my own free will, 1*b*. 10*m*. 2*g*. of unassessed waste land in Changa Alna, pargana Kokooakhand, lying in my estate, for the services of the said *thakur*, and place Ram Das Adhikaree in charge thereof. Let the trustee cultivate the lands year by year, settle raiyats, and make gardens thereon, and devote the incomes therefrom to the services of the *thakur*, and be engaged in blessing me for ever.
>
> Dated the 15th 1171 Amli."

(*b*) *Gramdebi*, which should be distinguished from the above *debottar* lands, being portions of lands which have been set apart in each village in honour of the *thakurani* or tutelary deity of the place. Such lands are generally very small in extent. The *thakur* or god is lodged in a thatched house, while the *thakurani* or goddess is generally placed under a tree or sometimes even in the open plain. Brahmans and barbers are generally in charge of such lands, and though their duties are not found quite specified, it would appear that they are to act as trustees and to perform the usual ceremonials, and not in any case to alienate any portion of the endowment. In the case of all *debottar* lands, should the worship of the deity be discontinued, the land becomes, according to the settlement, the property of the State.

(*c*) *Amrita monohi*, which are endowments of lands given rent-free for the support of the temple of Jagarnath and for various other purposes connected with the worship of the god here. Collections are made in these places by the agents of the trustees, most of whom reside in Puri, and these collections go to providing sweetmeats, rice and dâl to the idol, which, after being offered, are distributed among all who are present.

(3) *Khairat.*—Sir William Hunter confines this tenure to "endowments for a Muhammadan charity;" but from a perusal of the translation of a *sanad*, which is given below, it will be seen that such grants were made in favour both of fakirs and *baishnabs*, so that they are really grants to individuals other than Brahmans, *e.g.*, we find that such *lakhiraj* lands in Balasore are often given to *nayaks* or astrologers. In the district referred to, however, similar grants to Brahmans sometimes went by the name of *khairat*:—

> *Translation of a sanad of khairat land.*—"I, Gopinath Dhir Narandra Mohapatra, zamindar of killah Madhupur, thana Pachera, Sirkar Badshanagar, do hereby declare that as Joponidhee Mohant Daulut Puri Gosain has no property for his maintenance, and as *fakirs* and *baishnabs* frequently stop at your place, therefore *mauza* Ahoban of the said killah is bestowed on the said Mohant for charitable purposes, *i.e.* to enable you to meet the expenses of the travellers and *fakirs*. It will be your duty to cultivate the *mauza* property, and to expend the produce of the land and other incomes, viz., fisheries, garden rent, contributions, &c., to the entertainment of the travellers, and bless me for ever. If any *hakim* will resume

it, it will be my duty to release it; you shall have no concern in the matter. If any of my heirs should resume it, he will be guilty according to the *shastras*. Wherefore, under certain conditions, this gift is granted, that it may be of use hereafter in cases of need.

To tahsildars, zamindars of Killah Madhupur, thana Pachera, Sirkar Badshanagar, and *wahidadars* and zamindars of pargana Jodh, *mauza* Rajendropore, under Sirkar Bamain. Be it known to you 1*b*. 14*m*. 5*g*. of land from the total area of *mauza* Bhobun, Killah Madhupur, is given for charitable purposes to Sangram Puri Gosain according to his former *sanad;* for the present, however, the previous rules are to be promulgated, and you are accordingly directed agreeably to the rules pursued for the crops of 1187: you will release the crops of 1188 to the said Gosain without making any objection.

7th day of Royab 1188.

The 11*b*. 14*m*. 5*g*. of land which is given from the total area of *mauza* Bhobun, Killah Madhupur, and held as *khairat* by Sangram Puri Gosain according to former *sanads*, is likewise hereby confirmed."

(4) *Pirottar.*—This corresponds to the *debottar* land of the Hindus, being rent-free land set apart for the maintenance of mosques or other Muhammadan religious establishments. The individual in charge is trustee and performs the religious ceremonies, such as the recital of prayers and presentation of offerings. The following *sanad* was given under the seal of Raghava (Raghoja Bhonsla), the son of the Prime Minister, "who is a bee in the lotus feet of Saha, the king":—

"To the worshipful Kudam Rasool—

Be it known to the *wahidadars, zamindars, darogahs, kharidadars and putnidars* of pargana Bakrabad, &c., and of all the *sirkars*, that whereas, according to grants made by former sovereigns, 143*b*. 3*m*. of land situated in the said pargana was assigned for repairs of the said *dargah*, the *fatiah* (offering of food or oblation to saints, &c., with prayers), the offering of sweet-scented flowers, and for repairs and reconstruction of its buildings, and for the maintenance of readers of the Koran, &c., the same assignment is confirmed by these presents. You are to release the proceeds of the said lands, *patnas*, bazars, &c., which have accrued during the year 1196, to Daroga Gholam Rasul, as has been done by *parwana* in 1195. You shall never resume the said lands, nor attempt to dispossess from the same, in obedience to orders of any *hakim*, for the realization of any dues from the same.

Herein fail not according to these orders.

Dated the 1st Sahar Rabial Aul, 1196 (Amli)."

(5) *Madadmash* is the term applied to lands granted free of rent for the support of Muhammadans, *e.g.*, the Mussulman fakirs.

(6) *Maáfi Kharida.*—The word *kharida* means purchased, and *maáfi kharida* is applied to those *lakhiraj* tenures which originally were not given gratuitously by, but purchased from zamindars. They were, however, treated as rent-free tenures, and have been accepted as such by the present Government.

(7) *Khusbas*, *i.e.*, lands endowed to men of the higher castes (Bhaddras), such as the Karans, Kaistas, and Khettris, who are known as *khusbas* raiyats. Such grants also go under the name of *mahatran*, the only difference being that *khusbas* grants may be made also in favour of Brahmans.

(8) Besides these there are some other rent-free tenures, *e.g.*, *Anagruhi*, *dattanagruhi*, &c., &c., given for the maintenance of the members of a Raj family, the Raja's dewans, Beborttas, &c., &c.

(*ii*) *Jagir or service tenures.*—The *jagir* lands belong to those persons who have the privilege of holding land rent-free in lieu of certain services rendered by them. Under the old Hindu Rajas, all public servants, policemen, and revenue officers were remunerated by grants of lands. These *jagirdars* still held their lands under the Moghul and Mahratta administrations, though in some cases they were made to pay a small *quit-rent.* At the time of the first thirty years' settlement, however, a very large portion of this land was resumed, the remaining *jagirs*, chiefly those of village officials and servants, being confirmed because of "the services rendered by their holders to village communities or the public at large." In the margin are noted the names of the various servants and officials, who (according to Babu Ranga Lall Banerjee) were found employed in the province when it was ceded in 1803. A detailed account of the village organization, and of the duties and privileges of these servants and officials, has been given in a preceding part of the report.

1. Páík.
2. Ráhbár.
3. Dhobá.
4. Bhándárí.
5. Chowkia.
6. Khandait or biswal.
7. Patwari.
8. Barháí.
9. Kámár.
10. Kumbhár.
11. Nayak.
12. Nakurchi.
13. Mehter.
14. Ghat manjhi.

CHAPTER V.

COMMUNICATIONS.

Rivers and Canals.—All the large rivers of the district are navigable at certain seasons of the year. Some of them get dry during the hot season and do not admit of navigation in their upper reaches, but there is always sufficient water to enable country-boats to pass and repass further down their course. As a full account of these rivers has been given in another chapter of this report, nothing further need be said about them, except that the trade on them has been greater developed by the opening out of canals, which take off from the rivers, and which have furnished communication connecting the interior of the district with the sea coast. The effect these communications have had on trade will be noticed in the chapter on the trade and commerce of the district. An account of the canals themselves has been given in a preceding chapter.

Railways.—There is at present no railway in Cuttack. The need of one has, however, been long felt by Government. Reconnaissance surveys have been made and statistics gathered, so as to start a project which would open out the country by connecting it with districts to the south and north of it, and the work has now been commenced.

The southern portion of the work in connection with the Madras East Coast Railway is well in hand. This line will start from Bezwada Junction in the south, and going along near the Madras Grand Trunk Road will end on the right bank of the Katjuri at Cuttack. Bridging the Mahanadi at Naraj, it is proposed to connect this railway with the Bengal-Nagpur Railway by a line which will run west and south of the Mahanadi as far as Sambalpur. Such an extension connecting Cuttack with the Central Provinces will do much to develop the trade of the district, feeding the Orissa canals and finding traffic for the Orissa harbours, especially for False Point, which is the very best harbour on the east coast of India. It will also be a most important line for passenger traffic, conveying pilgrims for Puri from Bengal, the North-West and Central Provinces, and under such circumstances is calculated to prove of the greatest usefulness in enhancing the prosperity of Cuttack, and in fact of the whole province of Orissa.

Roads.—Provincial and District Roads.—When the province of Orissa was taken over by the English in 1803, there was not a single road in existence in Cuttack. Carts passed over large tracts of uncultivated ground. The district is now well supplied with roads, one of which is under the management of the Public Works Department, and the rest under the District Road Cess Committee.

The chief road in the district is the Grand Trunk Road from Calcutta to Ganjam. Passing through Balasore, this road, which is under the management of the Public Works Department, enters the district at Roryah just at the point where the Baitarani river cuts the High Level Canal. It then goes along the High Level Canal, crossing the Kharsua, the Brahmani, the Birupa, and the Mahanadi, until it reaches Cuttack, from where it throws off a branch to Puri known as the Puri Road, so largely used by pilgrims going to Jagarnath. This branch leaves the district at the outpost of Bulwunta, while the main road goes along through the Khurda estate to Ganjam.

The most important district roads are—

(1) The Cuttack-Chandbali Road.
(2) The Cuttack-Taldanda Road.
(3) The Kundulpur-Machhgaon Road, branching off from the road to Taldanda.
(4) The Cuttack-Sonepur Road, passing through the boundary of the Banki estate.

The first of these, starting from Cuttack, goes along in a parallel line to the Kendrapara Canal until it reaches the subdivisional town of Kendrapara. Here it takes a north-east direction to Patamundi, after which it crosses the Brahmani and then goes on due north to Aul. From Aul, it continues its north-easterly course, crossing the Kharsua and passing through Ganja, the head-quarters of the Kanika estate, until it reaches the port of Chandbali, completing a course of 63 miles. The portion of this road which is most used for traffic lies between Cuttack and Patamundi. Through trade is confined to the time the canals are closed for annual repairs (*i.e.*, about a month or a month and-a-half), and then only articles urgently wanted are carried by it. The steamer service on the Kendrapara Canal takes up the greater portion of the trade between Cuttack and Chandbali.

The Cuttack-Taldanda Road is 41 miles in length. It passes along the right bank of the Mahanadi and parallel to the Taldanda Canal. On the 11th mile, the Kundulpur-Machhgaon Road branches off, completing a course of 32 miles before it reaches its limit. Both these are very important trade routes, and both are continuous without break or ferries.

The Cuttack-Sonepur Road is important inasmuch as it carries some of the traffic between Cuttack and the Central Provinces. Only a portion of this road is under the District Board of Cuttack.

The other district roads are of secondary importance. The following schedule, obtained from the District Engineer's office, gives a description of them, with their names, courses and mileage.

Five classes are distinguished in the schedule, viz.—

Class I.—Roads above high flood level, metalled and bridged or having ferries.
„ II.—The same, but unmetalled.
„ III.—The same, but with temporary bridges.
„ IV.—Low-level roads above ordinary and under high flood level.
„ V.—Surface tracks.

DISTRICT ROADS.

No. of road.	From	To	Length.			Class.	Description, noting culverts, bridges, planting of trees, &c.
			Miles.	Fur.	Yds.		
1	Taldanda Loop Road—						
	No. 2, Taldanda Canal Bridge, Chuttra Bazar.	3rd quarter of 2nd mile of Taldanda Road.	...	5	147	I	Metalled with laterite over laterite rubble soling. Two culverts. Trees planted throughout.
2	Jobra Pilgrim Road—						
	Panchgachia Bazar on right bank of Mahanadi.	No. 2, Taldanda Canal Bridge, Chuttra Bazar.	1	5	6	I	Ten feet metalled with laterite over laterite rubble soling. Three arched culverts. Trees planted over greater part.
3	Cuttack ...	Taldanda ...	41	5	53	I, II, & IV.	The first portion of this road (13½ miles in length) is metalled with laterite over laterite rubble soling for a width of 12 feet. Eight causeways with brick masonry walls and metalled. The road crosses bridges over weir and lock at Biribati on the 7th mile, an escape on the 28th mile; also 18 culverts over distributaries maintained by the Department of Public Works, several others being under construction. Trees planted along 22 miles.
4	Kundulpur (11th mile of Road No. 3).	Machhgaon ...	32	2	23	I, II, & IV.	The first 2 miles (600 feet) are metalled with laterite over laterite rubble soling 12 feet wide. On the 11th mile (this is first of the road, the mileage being counted from Cuttack) is a bridge of 28¾ feet span, on the 34th mile one of 2 spans of 10½ feet. Seventeen masonry culverts and drains, and 12 causeways with brick masonry walls and metalled. The road crosses 19 culverts over distributaries and one over a drainage cut, which are maintained by the Department of Pubic Works. Trees have been planted along 11 miles.

No. of road.	From	To	Length.			Class.	Description, noting culverts, bridges, planting of trees, &c.
			Miles.	Fur.	Yds.		
5	Cuttack ...	Chandbali ...	63	1	90	I, II, III, & IV.	The length from Kusunsur, on the left bank of the Mahanadi, to the 7th milestone is 3 miles 5 furlongs. This is metalled for a width of 10 feet with laterite over laterite rubble soling. A length of 1 mile 5 furlongs 80 feet of the 48th, 49th, and 50th miles is metalled with brick 8 feet wide. Forty-eight culverts and drains. Eight timber bridges, twenty-three causeways with brick masonry walls and metalled. Besides, there are the following bridges:—on 24th mile, one of 4 spans of 12 feet; on 36th mile (Gobri river) one of 5 spans (4 of 25 feet, 1 of 30 feet), and on 45th mile a brick masonry arch bridge 4 spans of 5 feet. The road crosses by bridges on the 6th mile the Kendrapara Canal, on the 48th mile the Patamundi feeder canal; also 83 culverts over distributaries, and one over a drainage cut. These were built and are maintained by the Department of Public Works, and others are being built. Trees planted along 28 miles.
6	Part of Cuttack-Sonepur Road—Mund Mohan...	Boundary of killa Banki.	20	7	20	I, II, & IV.	Half of the 9th, 10th, 11th, and 12th miles metalled with laterite kurkutcha, laterite rubble soling being used where wanted. Portions of 16th and 17th miles metalled with sandstone; width 8 feet. On the 24th mile the Runn river is unbridged. It is fordable during the dry season, and during the rains is crossed by a zamindari ferry. On 13th mile a bridge of 2 spans of 10½ feet. On 22nd mile Kanjia nala, a sandstone masonry bridge with brickwork arch of 30 feet span. Twenty-six culverts (11 of laterite and 15 of sandstone masonry), 4 having timber platforms, and 22 arches. A causeway of sandstone blocks.
7	Tanghi ...	Haripur (Dhenkanal boundary on way to Kopilas).	12	3	88	I, IV, & V.	The 1st and 2nd miles have been metalled, 8 feet wide, with laterite over laterite rubble soling. Beyond the 2nd mile the road was only laid out in 1888, and jungle cleared and rooted out. Eleven culverts (3 of laterite masonry and 8 of laterite dry laid). One causeway, laterite metalled. Three culverts, maintained by the Department of Public Works, cross their distributary and drainages, and a girder bridge crosses the High Level Canal on the 2nd mile.
8	Phulnákrá ...	Mádhab ...	20	5	158	II	The length shown belongs to Cuttack, intervening portions belonging to the Puri Board aggregate 5 miles in length. On the 25th mile the north branch of the Parachi has been closed by an embankment; the south branch is unbridged; some materials (bricks and ghutin) have been collected for the construction of a bridge, but the work is indefinitely postponed owing to want of funds. Eleven arched culverts (9 brick and 2 laterite masonry), and one brickwork masonry culvert of 15 feet span with timber platform, and one causeway.
9	Jajpur ...	Kuákhiá ..	9	3	216	II & IV.	The Buda nala is unbridged; it is crossed by a zamindari ferry. The Kharsua, also unbridged, has a district ferry. During the dry season both these streams are fordable. The Dudhai nala is bridged by a brickwork arched structure of 19 spans of 14 feet. Six causeways with brick masonry walls and metalled, and 8 brick masonry arched culverts. The portion of this road between the Buda and Kharsua rivers is impassable during floods. Trees have been planted along five miles.
10	Jagatsingpur ...	Sirloh ...	10	6	80	II, III, & IV.	The road was not laid out as a whole at one time, but has gradually been made a district road by improving village roads over the settlement tracks. It crosses the Cross Katjuri by an embankment with a culvert in it; the Hansua drainage by a brick masonry bridge with timber platform of 3 spans of 15 feet; the

No. of road.	From	To	Length.			Class.	Description, noting culverts, bridges, planting of trees, &c.
			Miles.	Fur.	Yds.		
							Taldanda Canal, where a punt is kept by the Department of Public Works; the Nagasara branch of the Mahanadi, which is unbridged, but fordable during the dry season, and crossed by a zamindari ferry during the rains. A brickwork masonry bridge with timber platform of 2 spans of 12 feet. Fifteen arched culverts and drains (11 of brick masonry and 4 of concrete). Three timber bridges. The District Board also maintains over distributaries a timber bridge, 8 spans of 10 feet, a brick masonry culvert 4 feet with timber platform, and a 2-feet arched drain of brickwork. Five culverts over distributaries are maintained by the Department of Public Works, and two distributaries are still open.
11	Jagatsingpur ...	Joypur ..	8	3	173	II & IV.	Over the Buri nala, converted into a main drainage line by the Department of Public Works, is a brick masonry bridge of five openings (3 of 17 feet and 2 of 19½ feet) with timber platform. Eighteen culverts arched (concrete, 17 of them having brick masonry parapets), and 4 causeways. Four culverts over distributaries maintained by the Department of Public Works and many irrigation pipes put in by villagers.
12	Salehpur ...	Mahanga ...	8	6	...	II, III, & IV.	One brick masonry arched drain. Two timber bridges. Eight brickwork masonry culverts with timber platforms have been built by the Board over distributaries. Four distributaries are open, over which the Department of Public Works will build culverts, as they were made after the road was constructed.
13	Ichapur (boundary of the Kendrapara Municipality).	Marsaghai ...	5	4	3	III	There are five timber bridges, the largest being of five openings (four of 15 feet and one of 25 feet). Four culverts, arched (three of brick masonry and one of concrete). The road crosses one culvert over a distributary maintained by the Department of Public Works. Trees planted along three miles.
14	Kendrapara ...	Jajpur ...	25	2	191	II, III, & IV.	The river Brahmani is unbridged, but has a district ferry. The Kharsua is fordable during the dry season; during the rains it is crossed by a zamindari ferry. Five arched brick masonry culverts, six causeways, and 11 timber bridges. The road is badly breached on the 9th and 10th miles, but it is not desirable to incur the heavy expenditure required to make this good, as projected works of the Department of Public Works will alter the conditions of this part of the country. Two culverts over distributaries and a bridge over the Patamundi Canal are maintained by the Department of Public Works. Trees planted along seven miles.
15	Gogna ...	Tambalo ...	3	1	10	II, III, & IV.	Two brick masonry arched culverts and two timber bridges.
16	Kendrapara ...	Bospur ...	4	7	...	II & IV.	Six brick masonry arched culverts. Two culverts crossing distributaries maintained by the Department of Public Works.
17	Jalpur ...	Kyanh ...	17	5	150	III, IV, & V.	Three causeways with brick masonry walls and metalled. Ten timber bridges. The Benga nala unbridged, but fordable during the greater part of the year.
18	Rambagh ...	Chattrapada ...	7	4	96	III, IV, & V.	The Benga nala unbridged, generally fordable. One brickwork masonry culvert, with timber platform. One brick masonry sluice culvert arch. Five timber bridges.
19	Nischint Koil...	Kundapatna ...	9	2	...	III & IV.	Two brickwork masonry stone arched culverts, three brickwork masonry drains, two timber bridges. This road crosses 11 distributaries and one Department of Public Works drainage channel over which culverts will have to be built at the expense of the Board.

No. of road	From	To	Length.			Class.	Description, noting culverts, bridges, planting of trees, &c.
			Miles.	Fur.	Yds.		
20	Kendrapara ..	Golra Hát ...	6	6	80	III & V	A timber bridge over the Similia nala, of 3 spans of 11 feet. One brickwork masonry culvert with timber platform; one concrete drain, three brickwork masonry drains, three timber bridges, besides which a timber bridge of 2 spans of 11 feet over a distributary is maintained by the Board.
21	Chandol ...	Golra Hát ...	4	1	46	III & IV.	Three timber bridges. The road crosses four distributaries, the cost of bridging which must be borne by the Board.
22	Baruán ...	Kalamatia ...	16	...	...	IV	Five timber bridges, thirteen causeways. The 6th mile is badly breached and a causeway on the 8th mile is too deep. It is proposed to put bridges in these places. Trees planted along one mile.
23	Indropa ...	Srirampur ...	5	6	150	IV	The Buda nala is unbridged. Fourteen brick masonry arched culverts; one causeway.
24	Jajpur ...	Balighai ...	1	7	48	IV	A branch of the Baitarani unbridged is crossed at Jajpur, and the road ends at another branch of the same river on the boundary of the district. Five brick masonry arched culverts.
25	Dharmsala ...	Kaema ...	2	4	16	IV	Two laterite masonry culverts with timber platforms, four dry-laid laterite drains with covering stones, three causeways.
26	Katia ...	Ahias ..	8	2	100	IV & V.	Three timber bridges.
27	Patamundai ...	Indpur ...	11	...	116	IV & V.	Sixteen culverts and drains (13 of brick masonry, 3 of concrete). One timber-topped bridge.
28	Jajpur ...	Pachikot ...	19	...	...	IV & V.	Two timber bridges.
29	Baruán ...	Balichandrapur	14	3	118	IV & V.	The old Mahratta bridge of stone masonry over the Rasunia nala, 3 spans of 15 feet. This road crosses the Brahmani, Kelua branch of the same river, Gonguti and Birupa rivers, none of which are bridged. The zamindari ferries over them have only boats for foot-passengers.
30	Kendrapara ...	Purushuttumpur	4	7	...	IV & V.	Nothing has yet been done to the last 2 miles 4 furlongs 18 yards. Two brick masonry arched culverts.
31	Baideswar ...	Kala Pathar ...	4	2	176	IV & V.	....
32	Charchika ..	Tulsipur ..	5	1	163	IV & V.	One laterite masonry arched culvert; two nalas unbridged—the Gurgurria and Nadikunda.
33	Tikri ...	Marsaghai ...	6	4	60	V	This road crosses the rivers Nuna and Chitartala at their junction by a zamindari ferry.

Village Roads.—Although the district has of late years considerably developed by the opening and extension of good village roads, which to many cultivators have been a new source of income, in that they have been able to use their plough-bullocks for carting in the intermissions of agricultural work, there are still many places in the district where there are no village roads whatever, and often all communication among the villagers is done by wading through the water of *jhores*. Such a plan is attended with great danger, as many of these *jhores* are infested with alligators which injure or kill some men of the village every year. Steps, however, are being taken to remedy this state of affairs by the District Board, which has risen to see the necessity and importance of opening up these communications. It is a healthy sign, that duringt he current year (*i.e.*, 1891-92) the District Board has allotted over twenty thousand rupees for village roads, and every effort will be made to see that this sum is spent judiciously. Some of those that had existed during the time of the last settlement have been encroached on or have been diverted into new paths to suit the convenience of the new village, so that existing roads are found to be often very different from the old settlement tracks. These settlement tracks were exempted from assessment at the last revenue settlement, and accordingly where they do not correspond with the present road communications, they are to be found in the unlawful occupation of some raiyats. The zamindar enjoys all the benefits of this anomaly. He pays no revenue for the lands covered by the settlement track, but at the same time takes rents from the raiyats who may be in possession of them. The new roads which have been made through the village in the place of these settlement tracks take up, however, a portion of the land of the raiyats. For these, the raiyat gets no remission from the zamindar, so that he pays both for the settlement track and the new road, whereas the zamindar, enjoying the rents of both, is exempted from paying for the former. I hear that the Settlement Officer of Orissa has been asked generally to mark out in each village the settlement track as shown in the old settlement papers. In those villages where the present road communications do not agree with the old settlement tracks, the anomaly could be removed by substituting the area exempted from assessment at the last settlement on the site of the existing road.

Suggestions and remarks.—While urging the extension of village communications, I have also to add that the district roads are sadly in want of repair, and much good would therefore result from money being allotted from the Road Fund for their improvement. The District Engineer, on being asked by me which of the district roads required repair, most promptly told me *all.* The Vice-Chairman of the District Board, while recently making a tour of inspection, found that all the important roads, such as the Cuttack-Chandbali Road and the Kendrapara-Jajpur Road, were in a disgraceful condition. Many parts of these roads are under water during the rains, which render the passage of carts impracticable; and after the rains, the ground gets so hard and the surface becomes so uneven with sharp projections that the roads become utterly unfit for use. The wooden bridges on those roads are also, many of them, in a bad condition with rotten planks, and several holes which render passing across them at night positively dangerous. In travelling through the district, I have been able to see the state of the roads myself, and am giving no exaggerated description of them. Considering that an immense traffic is carried on such roads, it seems absolutely necessary that prompt steps should be taken to repair the roads, however expensive the cost may be. The matter may well be submitted to the District Board for consideration.

CHAPTER VI.

COMMERCE AND TRADE.

A brief history of the trade of the district.—At the time when Orissa was taken by the British, the trade of the district of Cuttack, like that of the whole province, consisted chiefly in the exchange of rice for shells (*cowries*) and cocoanuts. Vessels from the Maldive Islands brought *cowries*, cocoanuts, coral and dried fish, and took back rice and earthen pots. Besides this, Government salt was carried to Calcutta in *sloops*, and rice was exported there during the cold weather. Swine and horned cattle were also taken by land to the Calcutta market. The export trade, however, gradually dwindled down, until in 1813 rice and salt were the only articles exported. The internal trade at this time was solely confined to rice. Seven years later, about the year 1821, trade again began to flourish, and it is since then with the proclamation declaring the freedom of trade, and with the opening of new communications, that the trade of the district has greatly developed. The trade of Cuttack, at the present day, consists chiefly in the exchange of agricultural products in their raw state for foreign manufactures, metal, and articles of luxury. To begin with the export business, in Cuttack it is almost entirely monopolized by a few rich merchants who have been able to obtain a footing by making large advances at favourable rates and by undertaking the risk of sending large consignments by sea. These merchants have their agents, who establish small storing depôts in scattered parts of the district, and make large purchases of rice at the markets. They then send out their rice to the chief ports (False Point and Chandbali), whence it is shipped to foreign countries or to other parts of India. There are many traders, however, who largely deal both in articles of export and of import. They are furnished generally from the Telis and Guryas of the district, as well as from Bengális, Marwaris, Bhojpuris, Telingas, and Garjati Jawlias, who with their greater industry and spirit of enterprise have established themselves to the exclusion generally of the Urya. These men are called mahajans. They make advances of money to petty tradesman or dealers known as *beparis* or *gumashtas*, who go to different parts of the country, buying in at the cheaper markets and selling off to advantage at the dearer ones. At the close of the year, or of any other definite period of time, they return home, render an account of their transactions, and pay the mahajan the money they had borrowed, together with a share of the profits. The latter is divided between the mahajan, the *bepari* and the owner of the boat or pack-bullocks used in conveying goods from one place to another.

Sometimes the mahajans have *kothis* or warehouses in different parts of the mufassal, where they station resident agents or *kothi gnmashtas*, who are often some near relative of the mahajan. Goods are bought and sold here, and sent off also to the mahajan, and at the end of the year accounts are settled, and the profits that accrue from the year's transactions divided equally. Some traders, besides dealing in all kinds of produce themselves, also serve as *middlemen* or brokers between the buyer and the vendor for the sale of miscellaneous goods brought by the latter. They are then known as *dandidhars* (literally weighmen), *i.e.*, men through whose intervention purchases and sales are effected. Their brokerage or *pawseri* amounts to about two pice per rupee.

With regard to the transactions between the money-lender and his client, it should be noticed that no *tamasook* or bond is given to the mahajan for the money lent by him, the transaction depending solely on the account books kept by him. By the richer mahajans and money-lenders the following books are kept:—

(*a*) *Rokor bahi* or *rajuni jama kharach.*—This is the daily register giving an account of the amounts day by day advanced to or received from creditors. Each page of this book is divided into two columns, the left-hand column being the credit side is known as *jama*, and the debit column is styled *kharach.*

(*b*) *Khata.*—This is a ledger compiled from the *rokor bahi*, showing each creditor's account separately.

(*c*) *Shalana jama kharach.*—This is an abstract made from the day-book, showing the total receipts and payments of each creditor at the end of the year.

Petty traders keep their accounts generally on separate pieces of palmleaf (*talpata*), each leaf containing the account of one customer.

Many mahajans are owners of wholesale or retail shops in town or in the mufassal. Foreign goods are imported by these merchants from Calcutta and elsewhere, and sold off at profit either wholesale to peripatetic dealers, or retail to all ordinary purchasers. In the first case, the travelling tradesmen carry their goods on pack-bullocks, and then dispose them off at retail prices at the many weekly markets or periodical fairs held all over the district. The shops noticed above are to be found chiefly in Cuttack, at the subdivisional headquarters, and at a few other important stations. They are held, as has already been remarked, chiefly by outsiders. In Cuttack town are the Marwaris, who have settled down here for the last thirty or forty years, trading chiefly in European piece-goods; the Bojpuris, who deal in spices, having settled in Cuttack for the last sixty years; the Telingas, who followed the Madras regiments to Cuttack thirty years, and have since established themselves as traders in Deccan clothes, chillies, camphor, &c.; the Cabulis, who, as in other parts of Bengal, preside at stalls of dried fruits of all kinds; and Muhammadans, who import all kinds of miscellaneous articles from Calcutta. The rate of profit in all these shops is about 4 annas in the rupee. The accounts kept by these shop-keepers is, as a rule, very simple, the transactions being all entered in two books respectively called the *saha bahi* and the *kharach bahi.* The first of these contains the names of the articles purchased and their prices, and the second the names of the articles sold with their prices.

Such accounts are sometimes kept on palm-leaf by the very petty Urya shop-keepers who deal in rice, *dâl*, *ghi*, oil and condiments.

As has been remarked already, a very large amount of business is done in the weekly markets or *hâts* (sometimes held twice a week) and in the periodical fairs and *melas* which are held all over the district. In fact, almost all the internal trade of the district may be said to be carried on in these markets. The *hâts* are generally held in a convenient spot in the neighbourhood of some village where booths are erected for the accommodation of *beparis* and of their goods. Wells are sometimes sunk for the convenience of the people. For all these benefits, a small rent is taken by the owner of the land. People flock in from great distances to buy in stores for their week's consumption. These *hâts* are extremely useful institutions, and in many cases form the sole source from which the villagers can obtain their supply of the necessaries of life. Shops are very rare in small villages, and when found are generally of a very primitive nature, unable to supply a single family with provisions even for a week, and totally unequal to meeting the wants of a whole village. It may be interesting to give here a short account of one of these shops which I visited near Kendupatna, situated about 20 to 25 miles from Cuttack. The shop was owned by a benevolent looking old woman, bedecked in cheap ornaments of lac and metal. It measured 10 feet in length, 10 feet in breadth, and 4 feet from the ground to the eaves. The walls were made of bamboo twigs, mud walls being too costly, and the roof, which was supported on bamboo posts, was thatched with straw. Within was heaped together a miscellaneous collection of articles for sale, all in infinitesimal quantities, from rice, *dâl*, salt, mustard and cocoanut oil to betelnut, tobacco, earthen *handis* and kerosine oil—just enough, perhaps, to furnish supplies to a poor raiyat for a couple of days. From the *hât* and the *mela* the village has to take in its provisions. An account of them will be found in another portion of the report. Suffice it to say here that these markets form important media of the inland trade of the district.

Trade routes.—External trade routes—

(*a*) *By sea.*—The external trade of the district is carried on chiefly by means of steamers and sailing vessels which touch at the ports of Chandbali and False Point. The former of these is at the mouth of the Dhamra, playing an important part also in the trade of the district of Balasore. It was opened out only about 20 years ago, giving a great impetus to trade and passenger traffic, and, combined with the opening of False Point many years previous, has effected quite a revolution in the whole province. Before the establishment of these two ports, Orissa was quite an isolated country, but now it has become a busy centre of trade. The sea-borne trade is carried on with ports all along the coast in Bombay, Madras, and Bengal, as well as with foreign countries, with Ceylon, the Maldive Islands, Mauritius, London, and New York.

(*b*) *By land.*—External trade is also carried on by land with the Garjats, and the Central Provinces, Puri, and Ganjam by means of carts and pack-bullocks, and during the rains by boats.

(*c*) *By canal.*—There is a certain amount of merchandise carried along the Orissa Coast Canal.

Internal trade routes—

(*a*) *By land.*—The internal trade of the district is similarly carried on by land and water in carts, pack-bullocks and boats, consisting chiefly of cereals and pulses, country cloths, brass and bell-metal utensils, timber and firewood. The important routes by land are the Taldanda road, the Machhgaon road, the Chandbali road, the Grand Trunk road, the Sambalpur road, the Ganjam road, the road from Jajpur to Kyanh, and the road to Keunjhar through Sukinda *viâ* Senkchel Hât.

(*b*) *By water.*—The routes by water are furnished by the rivers and canals which traverse through all parts of the district. The Mahanadi and Brahmani, together with their main branches, the Katjuri, Birupa, and Kharsua, are navigable in all seasons in their lower courses, while their upper reaches and minor branches are generally dry during summer. There is a regular steamer service in the High Level and Kendrapara Canals, affording great facility to the brisk trade of the district, while the Taldanda Canal is regularly used by boats. These highways of commerce have now ensured a certainty of communication between Cuttack and the sea-board, and have helped most materially to develop the trade of the district.

General summary of internal trade routes.—The Chandbali road and the Kendrapara Canal, including its branch the Gobri Canal, connect Cuttack with the important port of Chandbali; while the Taldanda road and Taldanda Canal form a communication between Cuttack and False Point.

The High Level Canal and the Grand Trunk Road form the principal routes for the traffic of the Jajpur subdivision with Cuttack. The lower reaches of the principal rivers bring down the traffic of the Garjats, aided by the Keunjhar and Sambalpur roads, while the Ganjam road takes the traffic with Puri and Ganjam. Besides these, the whole district is intersected by a network of channels and creeks, all of which are navigable by country boats during the rains, and some throughout the year. Added to district and important village roads, they form important factors in opening out the most interior villages of the subdivision, so that there is generally some means of communication between the villages and trade marts of the district.

Trade marts.—The principal importing marts in connection with the trade of the district are situated along the canals. The places of supply are also similarly situated, or are in the neighbourhood of flourishing villages. The important marts for rice, the chief article of traffic, are False Point, Jambu, Bhutmundi, Cuttack, Marsaghai, Alba, Kendupatna, and Baraberia, and the most important place of supply is Cuttack. From Cuttack (where rich merchants have their head-quarters) rice is carried chiefly to Calcutta *viâ* Alba and Chandbali, the traffic being mostly in the hands of the India General Steam Navigation Company and of Messrs. Macneil & Co., who maintain a regular service of steamers from Calcutta. A portion of it is also carried to False Point in boats and along the Orissa Coast Canal in steamers. Among other important trade marts may be mentioned Kendrapara, Jajpur, Aul, Patamundi, and Bhaideswar.

Articles of Merchandise.—*Exports and imports.*—The articles principally traded in may be thus classified :—

(1).—*Articles of food,*—*e.g.*, paddy, rice, salt, *gur*, gram, garlic, spices, betelnuts, *ghi*, tamarind, salt fish, turmeric, mustard, dried fish, coriander seed, oil, betel-leaf, wheat, cocoanuts, tobacco, *saru.*

(2).—*Stimulants.*— *Ganja.*

(3).—*Staples of manufacture.*—Hides, copper, cotton, jute, cotton thread, leather, iron.

(4).—*Building materials.*—Timber, bamboos, stone, lime.

(5).—*Fuel.*—Firewood, coal.

(6).—*Cooking utensils and other domestic implements.*—Earthen pots, bamboo mats, furniture.

(7).—*Miscellaneous.*—*Kuchila*, myrabolams, lac, gunny bags, castor seed, gall-nuts, oilcake, straw, *til* seed and other sundries.

Of these, rice is the chief article of export. Jungle products, such as myrabolams, lac, nux vomica, wax, and resin, are also exported, besides oil-seed, hides, jute, timber, horns, feathers, bones, *panasi* grass, and silver filigree work The jungle products come in from the Garjats, and with the other articles above mentioned are sent off to Calcutta. English and Bombay piece-goods and kerosine oil and specie, which are brought in from Calcutta, are sent out again to Puri and the Garjats along with dried fish and salt. A portion of the cocoanuts which come from Puri is also sent to the Garjats.

In connexion with the exports, it may be remarked here that feathers, bones and *panasi* grass have only recently sprung up as articles of trade in Cuttack. The feather trade is confined to Muhammadans. Native *shikaris* of low castes receive advances of money from Muhammadan hide merchants, and supply them with the feathers of the crane, heron, kingfisher, jay and other birds of light plumage, selling the same by *tola* weight. The feathers are then exported to Calcutta. Bones have begun to be collected only lately. They are sent to the Aska Factory in Ganjam for refining sugar, and also to Calcutta, at present chiefly to Mackilican & Co. and to the Cossipore Chemical Works.

The principal articles of import from Calcutta are English and Bombay piece-goods, kerosine oil, crockery, glassware, liquor, specie, fancy goods, potatoes, lead, copper, zinc, gold, silver, and cotton yarn. Most of these articles are consumed in the district, and a portion, as mentioned above, is sent to the Garjats on the west and to Puri on the south. The articles imported from other places are as follow:—Salt, turmeric, chillies, sugar, and tobacco leaves from Ganjam; cocoanuts and cocoanut oil from Puri; wheat, pulses, oil-seeds, cotton and molasses from the Central Provinces; lac, nux vomica, myrabolams, raw silk (*tasar*), wax, resin, iron, horns, hides, timber, catechu, oil-seeds and feathers from the Garjats. Cotton goods, besides being imported by sea from Calcutta, are also imported by land from some other parts of Bengal, and from certain districts of the Madras Presidency. The importation from Bengal consists of fine muslins from Chandrakona, Ramjibanpur, Bissenpur, and other places; that from Madras consists chiefly of fine cotton goods and silken cloths from Ganjam and Berhampur.

Traffic registration.—The only statistics at present available of the traffic of the district are those of the export and import trade by sea registered at False Point, and returns relating to the trade on the canals of the district and the Orissa Coast Canal. Figures for these will be found in the appendix. It will readily be understood that they give no idea of the entire trade of the district, as they take no note of the road or river traffic which passes from Cuttack to neighbouring districts, nor of the trade that flows into Chandbali. The difficulty of securing a complete registration of the traffic of the district, so as to show exactly its resources and productive powers, is the considerable expenditure which would have to be entailed in the establishment and maintenance of registering stations. Should it be decided, however, to improve the registration of the trade statistics of the district, Cuttack, Barmul, Montira, Acquapadda, Telinga Bazar, and Baideswar may be selected as convenient sites for registering the inland trade which now escapes registration. A registration station on the Mahanadi at Cuttack and a second at Barmul would catch the trade passing on the Sambalpur road, and by the Mahanadi river between the town of Cuttack and Sambalpur, consisting chiefly of piece-goods, twist, spices, copper, lead, rice, *ghi* and molasses. Statements are given in the appendix, showing the amount of traffic registered at these two stations for seven months during the year 1882-83, when statistics were ordered to be collected by Government in connection with the proposed railway to Orissa. Montira, which is situated in killa Sukinda, would take account principally of the timber and forest produce which is brought into the Moghulbundee from Sukinda and the neighbouring hill countries, as also the piece-goods entering into the Tributary States. Timber and forest produce brought down by water during the rains and piece-goods going up the Baitarani or along the Trunk Road from or to the south would be registered at Acquapadda, situated on the border line between the districts of Cuttack and Balasore. Telinga Bazar, which is a portion of the Sadar station of Cuttack, is most conveniently situated on the Katjuri to register all the internal grain trade between the districts of Puri and Cuttack, as also the piece-goods and metals flowing into the former. Bhaideswar, which is situated on the extreme west end of the Banki estate, and in fact, of the district, would intercept all the trade with the Garjats which may escape registration at Cuttack.

Markets and fairs.—The important trade marts of the district have been noticed in a preceding paragraph. Besides these, there are numerous minor marts or *hâts*, numbering about one hundred and fifty, scattered all over the district, which are held every week on certain fixed days for the sale of the ordinary articles of consumption and of every-day use. The most important of these are Ichapur, Barhat, Mahipal, Thakurhat, Chandla, Mahalhat, Pandalo, Pilo Antoi, Pasai, Kespur, Chandanagar, Rajnagar, Kerapur, Ganja, Niali, Olabhar, Talsanga, and Nikrai in the Kendrapara subdivision; Gandkul, Katra, Bilhat, Tanghi, Champapur, Nischintkaito, and Kuhunda in the Sadar subdivision; and Binjarpur, Kaipura, Haripur, Katikata, and Kayangola in the Jajpur subdivision. Cattle are sold at some of the above *hâts*. When so sold, the buyer and seller both have to pay a small tax to the zamindar or farmer of the *hât*. In addition to the above, fairs are held in different parts of the district in connection with religious festivals. Some of these last for a day, others for a week, ten days, or even a month. Some of the petty fairs have no influence whatever on trade, but the principal *jatras*, such as the *Pous Sankranti jatra* in Pargana Katia, the *Salanuni* annual fair in Sargura, the *Mobabinakar mela* in Darpur, the *Charak Sankranti jatra* in Madhupur, the *Gundicha jatra* in Tikan, and the *Asakashtumi jatra* in Jajpur, attract many shop-keepers and merchants from Balasore, Bhadrak, the Garjats, and the subdivisional stations of the district of Cuttack, and while the fair lasts a very brisk trade is done in all kinds of commodities.

Suggestion.—The importance of such fairs would, in my opinion, be much enhanced if rewards were to be distributed at some selected *melas* for artistic and good workmanship. It should be worth the while of some of the influential members of the district to raise a fund for the purpose.

Fishes and fisheries.

Culture, preservation, trade, &c., in fish. Sources of supply—Fish afford food to a large proportion of the inhabitants of this district. All along the sea coast, from the extreme north-east corner of Kanika to the mouth of the river Devi, numbers of fish are caught and sun-dried, and then sold in local *hâts* or exported to the nearest mart for sale. The rivers and *jhores* also supply a goodly number during the season, so that fish food is not an uncommon item in the meal of every Urya. There are ponds scattered all over the district, but those that contain fish belong to private individuals, who rear not for sale as a trade, but for their own consumption and for that of their friends, so that these ponds and tanks do not in any way affect the supply in the market. Whether all this supply, however, is now equal to the demand is a much more intricate question to answer. From enquiries made by me all over the district among rich and poor, I am inclined to believe that, notwithstanding the very many species that may be found in the districts, the rivers and *jhores* are diminishing in their supply gradually. The evidence of all fishermen is, that the supply of fish during their younger days was much greater than it is now. It is very difficult to say how far such a statement is made in the interest of their own trade, but the unanimity of popular opinion seems to me to demonstrate clearly the fact of the decaying supply of fish. Present prices, too, are proportionately high. The diminution may easily be accounted for by the destruction of the fry and breeding fish. During the rainy season, the rivers in Cuttack are very high, and the adjoining country is, as a rule, submerged under water, every pond and tank being thus filled. The fish in this season migrate here to breed, when they are generally netted and caught. There is scarcely a watercourse or drainage channel, however small, the fishery of which is not let out by the zamindar. In the rice fields even, the surplus water is first let off, and the small fish entrapped and caught. Dr. Day mentions in his book on the Fishes of India, after having visited the irrigation works on the rivers of Southern India, that "the fish which, prior to the erection of the weirs, had ascended the rivers during the season of the rains for the purpose of spawning, were not only prevented from proceeding up stream to spots suitable for the deposition of the ova but were collected in such vast numbers immediately below these weirs, which they vainly attempted to pass, that the wholesale manner in which they were caught by the native fishermen almost amounted to the extermination of the spawning fish of each season."

Irrigation canals further afford an open route to the fishes, where they meet with obstructing weirs or bunds. They naturally descend into these canals, and when these are dried for examination by the Department of Public Works, these fishes are easily destroyed. Again, it may be noted that the land so slopes from the river bank that it is very difficult for the water to return to rivers after a flood, and the result is that the fish which have thus been taken and spread over rice fields can never again return. During the inundation season they ascend into flooded fields to deposit their ova, and are then easily entrapped. On making minute enquiries at Banki above the Naraj anicut, I was told by the Sub-Deputy Collector in charge of the estate, as well as by fishermen, that the fish-supply had considerably lessened of late years, and this seems to be the case in all the upper reaches of the rivers. During the winter and the hot months just preceding the rains, the water in the river is low, and the presence of the bund at Naraj consequently prevents fish from passing up towards Banki. This obstacle consequently diminishes the supply during these months, constituting as they do the months for catching fish in rivers. In the rainy season, on the other hand, fishes breed and do not, as a rule, rise readily to the surface, so that in this instance, too, they do not pass in large numbers above the bund, and in fact collect there, where, with their fry, they are entrapped, leading to a diminution of the next season's supply. Those that do pass cannot return as the waters get low, and are entrapped wholesale. But by far, the most perceptible cause in the decrease has been the entrapping of fishes by nets of very small meshes, and by raising bunds along the beds of rivers when they begin to dry up. I have seen men, women, and children along *jhores* as well as on the banks of large rivers busily engaged, when the water in rivers is very low, in damming up portions of the stream, and then destroying all the fish coming into the enclosure, whether full sized or young. It is thus the promiscuous slaughter of fishes, old and young, practically throughout the year, that has considerably tended to lessen the supply. The silting up of the beds of rivers has also put it more readily within the reach of fishermen to carry on this slaughter, and as the population has also increased, the demand being greater, there has been an increasing strain on the supply. Such being the case, prices have proportionately risen. In 1872 it was reported by the Collector that the price of large fish in the bazar was 3 annas per Cuttack seer of 105 *tolas*. It now goes as high as 4 annas and sometimes 5 annas a seer in Cuttack.

Castes employed in fishing and their earnings.—Although fish forms such an important item of diet, the profession of netting them is looked down upon, the Urya fisherman having but a low place in the social circle. So great is the prejudice that no respectable villager will demean himself by holding an angling rod, and the capture of fish is principally confined to such low castes as *Keots* and *Gokkhas* and *Kaibarthas*. People of other castes, however, are permitted to catch fish for their own consumption, but only with such traps as the *magura*, *bhojja koinchi*, *dhowri* and *paluka*, all of which are described below. The Keots and Kaibarthas fish with the net or *jal* alone; while the Gokkhas use the net, the *salua*, the fishing rod and fishing knife. Dhobas and Keras (gypsies) engage in spearing, and Bauris, Kandaras and other low castes use the angling rod. Fishing, as a man's sole profession, is not paying, and fishermen therefore either engage in labour or cultivation. It is the practice generally, and especially near the sea coast, to form a combination of some half-a-dozen persons and then to purchase a boat which is launched out during the season of catching, the rest of the year being devoted to other kinds of work. The profits after payment of fishery dues are equally shared, coming up to something like Rs. 2 or Rs. 3 per head per month. Near the estuaries of the large rivers, where the fisheries are extensive, one or two villages may be seen inhabited by

Keots, who follow no other profession but that of catching and selling fish; but these are very rare.

Season for catching fish.—During the rainy season, as has been already mentioned, no fish is caught in rivers, the time for netting them being the hot and winter months, especially the latter, viz., Pous, Magh, and Falgun. In the rains, however, they are entrapped in *jhils* or ponds which are filled from the floods of the rivers.

Dried fish.—(*a*) *Sun-dried.*—By the sea coast, near the estuaries of the different rivers, the system is followed of placing nets at the approach of the spring-tide and raising them at ebb-tide. The small fish which are now caught, such as *chingri*, *punti*, *dandkhui*, *&c.*, are dried on the spot by the river side and then exported to all parts of Orissa, some of it finding its way even to the Madras Presidency. This method of drying fish without salting is generally practised by the Gokkhas. The fish are not cleaned at all, but simply spread on the ground and exposed to the sun for a couple of days, when they are sold to mahajans at the rate of 12 Cuttack seers per rupee. Rainy or cloudy weather rots the fish, which being useless are thrown back into the river. The process of drying, however, is generally very incomplete, and fish when thus prepared and offered for sale have generally an offensive, putrid smell.

(*b*) *Salted fish.*—Larger fish undergo salting, the process being done by Keots. The fishes are split, their entrails removed, and then after being washed in fresh water they are mixed with salt or salt earth and exposed to the sun to dry. The proportion of salt to fish varies with the quality of the salt. At Kujang, I found that 2½ seers of salt were used for a maund of fish. This proportion is exceedingly low, and no doubt accounts for the obnoxious stuff that finds its way into the market. The best salt-fish is prepared by mixing one part of salt with three of fish. A good deal of this salt-fish finds its way from Puri across the Banki estate to Sambalpur, being sent there in boats by mahajans at Bhaideswar, an outpost in the Banki estate.

Pisciculture.—No regular system of pisciculture prevails, as the practice which is followed of stocking ponds simply serves to give a supply of food, and is not carried out for breeding purposes.

The fry is put in during the monsoon months, generally in June, and the tanks commence being dragged in January, some taking two or three draughts of fishes, others having their ponds dragged but once.

Implements for catching fish.—Fishes are caught by various means, such as—

(1) Nets.
(2) Traps.
(3) Baskets.
(4) Cloth.
(5) Angling rods.
(6) Spears.
(7) Torch lights.
(8) Knives.

The native names for the same, together with a brief description of each kind of implement, is now given:—

(1) *The Ghai jal.*—This net is made of cotton thread, and is generally used in shallow water. Two men are enough to work a single net, but very often two or three nets are combined together to entrap a large number of fish. The length is about sixty cubits, and the breadth four. In working it, one man stands stationary holding one end of the net, while the opposite end is taken out into midwater by the second man, who wades into the stream. Weights are put at the lower end, so that the net may sink to the bottom. Looped spaces skirt the net, and in these the fish are caught when trying to escape. The edges are drawn towards the shore gradually, and the fish then taken out by the hand. The cost of such a net would be about Rs. 20.

(2) *The Bhasha jal.*—This is also used in shallow water, and is very prevalent in Rajnagar in the Kanika estate. It is also called a *chankia jal.* The following description of its use is given in a report found in the Collectorate:—"It is used to catch fish near the banks of a stream. The fisherman holding one cord at one end throws the net into the stream. The floats attached to the top sustain one edge of the net above the surface of the water, while the mud weights attached to the bottom keep down the other edge. The force of the current stretches out the net to its full length, and it forms

a sort of a screen in the water which prevents the escape of the fish. The fisherman, as soon as he sees any fish near the screen, wades up to them and captures them with a bag-net (*garua*) which he holds in his hand for that purpose. Occasionally two men are employed in the use of this net, one at each end. One of the two remains stationary, while the other wades out into the stream, and when the net has been stretched out to its full length, returns to the shore. The net forms a semi-circular enclosure, the fish* penned up in which are taken by the hand net."

(3) *Kokot jal.*—This is made of *chanpat* or *sunn* (*Crotolaria juncea*). It is about 50 to 100 cubits in length, the breadth or depth from top to bottom being about 12 cubits. Some eight or ten men go out in a boat, encircle a certain compass of water with the net, and then gradually drag it with the fish.

(4) *Pagi jal.*—The length of this net is from 100 to 150 feet, and the breadth from 9 to 10 feet. It is made from *desi soota*, *i.e.*, thread locally made from cotton, the cost being about Rs. 16. Two men catching the two ends of the net, to which are attached ropes, stand on either bank, thus making a screen or wall with the net right across the river. The rest of the men, some four or five, wade out into the water and stand at regular intervals, with their feet holding down the bottom of the net, so that it may reach down to the bed of the *jhore* or river. Then one of the corner men, leaving his bank, brings his end to the second corner man, who remains stationary. The fishes are then removed by the hand and put into a little netted bag known as the *kheppa jal.* Some two seers are taken in each drag by this kind of net, and as during the course of the day the net is thrown into the water about eight times, 15 to 20 seers of fish represents very fairly the amount that may be netted in a day. .

(5) *Palona jal.*—This is used in very shallow water, especially in *jhils*, to catch small fish. The net itself is made of *sunn* thread, and is attached to a framework of wood, from which it hangs in the shape of a net to a depth of about three feet. One man is sufficient to work the net. Holding the framework by a handle, he places the net down at the very bottom of the *jhil.* Then he gradually lifts it up until he raises it out of the water. With the hand that is free he takes out the fish, which he deposits in a basket tied to his waistband or suspended over his shoulders.

(6) *Munda ghusra or kheppa or pa jal.*—As the very name would indicate, this is a net which is whirled round the head by the fisherman. It is circular, having leaden weights attached round the borders, which causes it to sink to the bottom. By means of a piece of strong rope which is fixed to the centre, the net is gradually dragged in with its draught of fishes. These nets are very common, as they are cheap and can be worked without much trouble, and are not to be confounded with the *kheppa* bag referred to above.

(7) *Gharna jal.*—Two men are sufficient to work this net, but the usual practice is to work with some six or seven nets bound together. At either end, ropes are attached, which being held by the hand, the net is gradually dragged at both the ends until a regular circuit is made, and then the ends brought together. The *gharna jal* is generally made of *sunn.*

(8) *Korasi jal.*—This is very similar to the *kheppa jal*, the only difference being that its meshes are much finer, so that it answers well for catching small fishes which may escape the larger meshed *kheppa* net.

(9) *Wastula jal.*—This is very similar to the *gharna jal* described above. It is used in deep water, and accordingly the circuit is made in a boat. One end of the net is held on land, and the other by the man in the boat. The net being dropped into water when the circuit has been made, the two ends are brought together, and then the whole net dragged ashore, where it is emptied out by the hand.

(10) *Chani Kendua jal.*—This is also managed from a boat. To the bottom end of the net two pieces of bamboo are attached by cords, the upper end being firmly fastened to the boat. After an hour or two, the net is drawn up into the boat by the cords and bamboos attached to the lower end.

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* There is another net called the *andola jal* which is very similar to the *bhasha jal*, the only difference being that it has no weights like the latter.

(11) *Muna jal.*—This is so called from its having the shape of a purse. It is a spiral net having one end opened and the other tapering to a point. The open end is attached to four stakes, and the net thrown into the stream. The force of the running water stretches out the net to its full length. The fish are thus driven in and caught at the tapering end. This net is used in creeks, and very commonly placed with its mouth at the point of any breach in the embankment to entrap the fish coming through the breach. Very similar to this is the *bodua jal,* differing only in the size of its meshes, which are smaller.

(12) *Khari jal.*—This is used in shallow water, being managed only by two men. It is very similar to the *gharna jal.*

(13) *Paluha jal.*—The following description has been given of this net:—"It is used in knee-deep water and consists of a pyramidal framework of five bamboos. Within the pyramid and attached to its base is a net. A cord tied to the centre of this net passes upwards through a small aperture at the apex of the pyramid. By means of this cord the net may be drawn up, so that it itself takes the shape of a pyramid within the framework. A man holding the instrument in his hand with the net raised by means of the cord before referred to, wades through the tanks and dips it into the water with the base firmly pressed against the mud at the bottom. Should there be any fish within the enclosure, the cord is let go, and the net falling down covers them under it. The fish are then picked up by the hand."

(14) *Gugri jal.*—This is a small net that can be used by three persons. It is floated or dragged, as the water is deep or not. The net is usually made of thread with meshes about half an inch in diameter.

(15) *Salwa or patti.*—This trap for catching fish is thus decribed by Dr. Day in his report on the fishes and fisheries of India:—"In Orissa the *salwa* or *patti* consists of very fine split bamboos, bound together by means of grass, the interstices between each piece being equal to one-fifth of an inch or less. This *patti* is about 3 to 5 feet high, and is in the shape of a regular wall net. It is taken to a tank and placed in the water in a V form, whilst the fishermen on either side extend themselves outwards, and by beating the water drive the fish into the enclosure. The two ends are now brought together, and the fish penned into a small space. The sides are advanced nearer and nearer until they almost touch, and the fish are removed by a hand-net or by the hand alone." A second method of entrapping the fish, especially where the creeks are narrow, is to place the net right across the creek from one bank to the other, forming a regular wall. One man remains stationary holding the trap at one end, while the second man holding the other end at the opposite bank gradually comes over to the side of the first man, forming with the *patti* a line parallel to the bank. Two or three men beating the water on the off-side drive the fish into the space between the banks and the net, when they are caught and removed by the hand. The trap is generally in use from Magh to Ashar.

(16) *Kalthi paluha.*—This is a conical shaped bamboo trap used in shallow water. The apex and base of the cone are both open. The fisherman fords along and thrusts the wider end at the base down into the puddle. He then puts his hand through the upper end and takes out the fish which are thus enclosed.

(17) *Khoinchi.*—This is a conical shaped basket similar to the above used also in shallow water. The apex is closed. Instead of being thrust down perpendicularly into the puddle, it is dipped into the water and almost immediately taken out, and the small fish that may be entrapped removed by the hand.

(18) *Magura.*—This is also similar in shape to the *paluha,* the difference being that the apex or narrow end of the cone in the *magura* is closed. The trap, unlike the *paluha,* is placed horizontally in the water. It is fixed to the ground, and the fish pass in from the broad end and are entrapped, as they find no egress at the opposite end. When fish have entered in, the *magura* is taken out, and the narrow end untied, and the fish then removed by the hand. The machine is used in shallow water in *jhils,* also in paddy-fields inundated with water. It is made of split bamboos tied together with grass.

(19) *Dhowri.*—Like the *paluha,* this consists of a circular aperture at the top, which remains out of water. Fish enter in through the sides, and not being able to reach up to the top to find an exit, are easily entrapped and removed by the hand.

(20) *Bhojja or Anduli.*—This trap is generally square or oblong in shape. It consists of two trap doors on two sides, through which the fish enter, when they are removed by an aperture at the top. The *bhojja*, like the *magura*, *khoinchi* and *dhowri*, are in use generally from the month of Ashar to Kartick.

(21) *Gerna.*—This is a knife in the shape of a sickle with large teeth used for killing fish in the hot months of Chaitra, Baisakh, and Jaishti. The instrument is flourished backwards and forwards, and then struck into the fish which have taken refuge in the mud, which are then subsequently removed by the hand.

(22) *Tenta.*—This is a spear used for transfixing fish which pass near enough. Like the *gerna*, it is used generally in Chaitra, Baisakh, and Jaishti.

(23) *Banshi.*—This is a fishing rod with a hook, string and quill.

(24) *Sute.*—This is a long string with a hook attached at the end.

(25) *Cloth.*—Plain cloth is also used to entrap fish generally in shallow water or on the banks of rivers when the fish may have flocked round some weeds or a cluster of *kiaghas* or any other grass.

Suggestions.—With regard to the measures of conservation that may be adopted, or restrictive remedies that may be proposed or discussed to check the gradual diminution in the supply of fish, it is very difficult to see what can be done beyond the adoption of the most stringent restrictions in connection with the fishing at weirs. Restrictive measures other than those must prove most vexatious, and will always be evaded. The Ūrya has always been accustomed to supplement his meal with a few small fish easily procured, and could scarcely do without this luxury, and it must take a long time before he can be made to understand the philanthropic object of the restriction that it is intended for the benefit of the public at large and for the generations which are to follow him. Then, again, the enactment of a fresh restrictive regulation would in many cases lead to police oppression, and thus the immediate disadvantages of any restrictive system all the more augmented. Better than this would be the plan of giving encouragement to the leasing of tanks to be stocked with fish, as is done in many parts of Bengal. At present such tanks are kept by rich people, who put in a small stock for their own consumption and never think of breeding fish for the market. Such tanks in the hands of fishermen could be converted into profitable speculations, while at the same time the bazar supply would naturally be increased.

CHAPTER VII.

MANUFACTURES, INDUSTRIES AND ARTS.

The manufactures of the district, with the exception of the *filigree* work of Cuttack and the bell-metal work of some villages in the interior, are of little importance, and generally of the coarsest kind, comprising, in addition to the articles mentioned, cotton cloth, *tasar* silk, woollen blankets, *chanpat* (*sunn*) paper, lac and brass ornaments, pottery, iron-wire articles, gunny bags and ropes of jute, baskets of wicker work, specialties in toys of horn, ivory, wood, and gut. An account of each of these manufactures is given below. That of *gur*, oil and *ghi* have been described elsewhere in this report. There is no manufacture at all by steam in the district, the only machines at work being at the Jobra workshops, where iron and wooden articles are made and chiefly used for Government purposes by the Public Works Department.

The manufacture of salt has not been mentioned above, as it has been discontinued in Cuttack. A short account of the process by which it was prepared would, however, not be amiss here, considering the important place it held in the manufactures of the district. Stirling in his History of the Orissa Province makes the following remarks about it in referring to the jungle tract on the sea coast along the east side of the district:—"In this wild, inhospitable tract, however, the finest salt of all India is manufactured, which under the monopoly system yields annually to the Company a net revenue falling little short of eighteen *lakhs* of rupees. The produce, distinguished for its whiteness and purity, before it has passed into the hands of the merchants, is of the species called *pangah* procured by boiling. The process observed by the

Molunghees or manufacturers is rude and simple to the last degree. The sea water, which is brought up by various small channels to the neighbourhood of the manufacturing stations or *khalaris*, is first mixed up and saturated with a quantity of the salt earth or efflorescence, which forms on the surface of the low ground all around, after it has been overflowed by the high tides, and which being scraped off by the *Molunghees*, is thrown into cylindrical receptacles of earth having a vent underneath, and a false bottom made of twigs and straw. The strongly impregnated brine filtering through the grass, &c., is carried, by a channel dug in the ground, to a spot at hand, surrounded with an enclosure of mats, in the centre of which a number of oblong earthen pots, generally about two hundred, are cemented together by mud into the form of a dome, under which is a fireplace or oven. The brine is poured into this collection of pots or *chulas*, and boiled until a sufficient degree of evaporation has taken place, when the salt is taken out, as it forms, with iron ladles, and collected in heaps in the open air. The heaps are afterwards thatched with reeds and remain in this state until sold, or removed by the officers of the agency. A statement will be found in the appendix showing the manufacture, import, sale and stock of salt in the Cuttack district for the ten years preceding the abolition of its manufacture, and the transfer of the Salt Department to the authorities in the Madras Presidency.

Silver filigree work.—The silver filigree work of Cuttack is mostly manufactured from an alloy of silver and copper in the proportion of half to one anna of copper to one rupee of silver. The alloy often consists of pure silver mixed with coin silver, the latter being used to give the silver the requisite hardness for working. Unalloyed silver is also used by the silversmiths. In order to prepare the alloy, pure silver is first melted with *sohaga* or *tangana* (borax) in a small earthen pot called a *ghadia* and poured into a *dhala* or mould made of clay or scooped out of a brick. Little bars of silver, about three or four inches in length and one inch in circumference, are thus formed. These bars are next beaten on the anvil with a hammer and converted into rods thin enough to be admitted into one of the larger holes of an iron plate called the *janta.* This plate is perforated with many holes of graduated size varying from a large pin's head to a pin's point. It is 5 to 7 inches in length, 1½ inches in width, and about one-sixth of an inch in thickness. Sometimes it is shaped in the form of a carpenter's square, the two sides forming the angle, measuring about six inches each in length. The thick wire obtained by drawing the silver through the bigger holes is made finer by being successively drawn through holes smaller in size. The process is continued until the requisite fineness is obtained.

A cubit length of silver wire can be drawn out of a *rutti* of silver, or 80 cubits out of a *tola* of silver, which, I am told, is the extreme length that can be obtained from the *jantas* used here. Finer *jantas* are used by the Benares workmen. The *janta* is held back with the feet while the workman is sitting with outstretched legs, and the wire is slowly and carefully drawn straight towards him with the *sandashi* or pincers which are held firmly in both hands. Oil is applied to the hole of the *janta* to facilitate drawing the wire through. The wire is then cut into bits of required lengths, according to the nature of the work to be done, with a pair of small scissors (ordinarily one of Rodgers' small nail-cutters). The outlines of the required work are then laid on a piece of talc and fixed to it with glue made from *kincha* (*Abrus precatorius*) seed and *sohaga.* The talc plate is placed on a stool or teapoy over which the workman stoops as he squats on the floor and proceeds filling up the details and intricacies of the work.

When the fixing of the entire work or portion of the work on the talc is complete, the plate of talc is placed over the fire and heated, during which process the talc separates from the silver. The article is now ready, requiring only to be cleaned and brushed and then polished. When done in several pieces, the process is similar. After heating, the pieces are laid aside and then joined together and polished. Besides this kind of work, moulding is also done by the silversmiths of Cuttack. It should be noticed here that *filigree* work is confined only to a few workmen, who are to be found in the head-quarters of the district. A large number of articles were sent to the last Calcutta Exhibition and deservedly elicited great praise.

Brass and bell-metal.—Brass and bell-metal are used for the preparation of different kinds of utensils for domestic purposes, such as plates, cups, ewers and drinking pots, and for sacrificial vessels, such as bells, spoons and water-jugs, for purposes of worship. Ornaments of all kinds for the arms, legs and feet are also manufactured and are largely worn by the women of the district.

Brass utensils.—The brass manufactured in Cuttack is a mixture of four parts of copper (*tamba*) and three parts of zinc (*khuppa*). Copper is bought in circular scraps or plates which are cut in small pieces by a *nihan* or *batali* (large chisel), and introduced into a clay crucible or *koi* (made of clayey earth mixed with paddy husks), to be melted in a furnace made white hot by means of bellows (*bhatti*) made of deer or sambar skin. Zinc, which is purchased in tiles, is also melted, and then added to the melting copper in the proportion mentioned above. The two metals are then well mixed together by stirring with an iron rod or *sanaguri.* Earthen moulds of different sizes, having been prepared beforehand and placed in a bed of sand and paddy husks, the molten mixture is lifted out of the large crucible by means of smaller crucibles held in a pair of pincers (*sandashi*), and is poured in and allowed to cool. In this state, the mixture is known as *ghuti.* When cooled, the metal is again well heated and then taken out to be beaten on the anvil into the required shape. Several nuggets of the mixture are beaten out in the same way, and then welded together into the shape of the vessel to be made. The anvil, which is made of the stone known as *akarma sila*, is about three feet in length, and has a diameter of about two feet. It is buried deep into the ground, only about six inches of it being seen above the surface. If a flat tray or *thali* is to be made, all that is required is to hammer the metal with an iron mallet (*hathuri*) into the required shape. For vessels like pots (*lotas*) and *ewers* much more trouble is entailed in the working. Some fifteen instruments of different shapes are used for hammering. When the pieces are ready, they are soldered together by a mixture of *pahan*, *i.e.*, copper, zinc, *ranga* (an alloy of tin and lead) and *tangana* (borax). To ensure their fitting together perfectly, the superfluous solder is removed from the joint while hot by an instrument called the *mathana* (a small iron hammer). The whole is allowed to cool and the join once more hammered with the *mathana.* The final process now left is the filing and polishing. After the joins have been once filed off with the *uha*, the vessel is again polished and planed with a chisel (*nahani*) or a lathe, and then subsequently rubbed with paddy husks. The article is now ready for sale. As a rule, ordinary domestic utensils are not ornamented, as, in consonance with the Hindu idea of cleanliness, they ought to be rubbed with sand and earth before being used, each time. The decorations would interfere with the proper cleansing of the vessels. When, however, the articles are to be ornamented, the workman holding the vessel between his feet works out all the designs on the vessel without any tracing or pattern, by simply drawing his chisel (*chani*) or iron-graver (*palumi*) over the vessel with his left hand, and continuing hammering it with a *mathana*, until the design is complete. In this way, borders and squares of all kinds are made with the greatest facility, as well as patterns of leaves and flowers, and figures of animals and gods.

Bell-metal utensils.—*Kansa* or bell-metal is very largely employed instead of brass in making domestic utensils, as it is found to keep cleaner. The vessels made in the district of this alloy are remarkable for their durability, and fetch a high price in the Calcutta market. The mixture used consists of four parts of copper of a more expensive kind than the copper used in making brass vessels, and one part of *ranga.* The process employed in the manufacture of articles of bell-metal is the same as that already described. Being of a harder composition, intricate ornamentation is found difficult, so that the only decorations seen in *kansa* vessels are simple borders and flowers.

Brass and bell-metal ornaments.—The different metals to be used for the alloy having been melted and mixed together in proper proportions, the alloy is poured into moulds of the required ornaments. For heavier ornaments, such as wristlets and anklets, the moulds are made of stiff clay well ground down and then mixed with finely chopped flax rope; while for smaller earrings, finger rings and nose rings the moulds are generally made of bee's-wax. When cool, the metal is taken out of the moulds and polished with the file and chisel.

Castes employed in the work.—These ornaments are generally made by the *Khaduhas* (*i.e.*, makers of the *khadu* or wristlets), while the utensils above described are prepared by braziers or *Thataris*, who after manufacturing them send them for sale to the *Kansaris*. Among the ornaments thus made are the *khadu*, *mudi*, *balá*, *pahúr*, *chúri*, *tárá*, *bida*, *rasunia*, and *nuli*.

The names of the principal domestic vessels made of the above metals are:—The *thali*, *lota*, *kalsi*, *pitab*, *kansa*, *katora*, *rekabi*, *panbatta*, *pigdani*, *dabur*, and *masuldani*. Many kinds of vessels, as previously remarked, are made solely for sacrificial purposes, some of the more common of which are the *arjathali*, *kosa*, *kusi*, *kalas*, and *dhupdani*.

The chief centres in the Cuttack district and in the Garjat hills, where bell-metal and brass work is carried on, are Kantilo, Bhuban, Mugdehi, Santrapur, Govindpur, Bainchuan, and Bhatimunda. The vessels manufactured are exported to Puri, Sambalpur, Sonepur, Ganjam, and Calcutta, where they always find a ready sale. Braziers are thus enabled to make a good income. I am told by an assessor of the district that some of the wealthier *Kansaris*, who are often the mahajans of the district, have an annual income of Rs. 3,000, while the average brazier makes Rs. 500 to Rs. 1,000 a year.

Cotton cloth.—Preparation of raw cotton for spinning.—The pods of cotton do not all ripen at the same time, and they therefore cannot be picked all together. Women, who are generally employed to do this work, go over the fields several times, picking the pods with one hand, and collecting them in a basket held in the other hand. The pods after being plucked are exposed to the sun and the husks removed.

Ginning.—The cotton is then cleaned by separating the seed from the fibre. This is done as much as possible, first with the hands and then in a small hand-machine called the *kapakhai*, which takes the place of a *gin*. The object of the hand cleaning is to loosen the fibre from the seed, so that it may be all the more readily *ginned*. The *khai* itself is a wooden implement consisting of two rollers, to which is imparted a revolving motion by means of a crank at one end. The machine is turned by a handle (*hata*) attached to the crank. The rollers, which are supported in uprights, are wedged tightly together, so that when the handle is turned, they work towards each other, the lower roller turning in a direction opposite to that of the upper one. When the machine is fed between these two revolving cylinders, the cotton is drawn forcibly through, while the seed, which is too hard and large to pass between the rollers, remains behind, and falls to the ground. As a rule, not more than five seers are *ginned* per day, but the machine if worked to its full capacity would be capable of *ginning* double the quantity. Men and women engage in this work, generally the latter, the work being performed as a rule by the members of the household.

Carding or *scutching.*—After the cotton has been *ginned*, the next process is that of *carding* or *scutching*. The *scutch* or *toola bhina* or *lathi* is a wooden instrument about a yard in length, consisting of a bow (*dandi*) of *dhaman* (*Grewia vestita*) wood, to one end of which is attached a broad wooden board or *phora* of the shape of a quadrant made of *salua* (*Shorea robusta*) wood.

A bow string (*tanta*) passes over a bridge (*kanti*) of *kasi* (*Briedelia retusa*) wood, attached to the other end of the bow, and is tied to the end of the board. A loop of string under which the left hand is passed to hold the instrument steady, and a wooden mallet (*magura*) of the shape of a dumb-bell, complete the machine. Holding the bow with the left hand under the loop, so that the string may just touch the cotton, the carder with his mallet twangs the string, so that it vibrates and strikes the cotton at each twang. The fibre is thus separated, and its texture being loosened, it flies off in a soft flossy condition, while at the same time all the dust and dirt fall out. This dust and dirt is about one-twentieth part of the weight of the carded cotton. The *scutching* is carried on exclusively by men of different castes. One man can turn out 3¼ Cuttack seers (of 105 tolas) of *scutched* cotton per day, for which his wages would amount to Re. 0-3-3.

Rolling.—After the cotton has been thus cleaned and separated, small masses of it are rolled together by a small bamboo rod (*balana*), about a foot in length, into *spools* or *wicks*. These are 6 to 10 inches long, and are thick or thin according as the thread to be spun out of it is to be coarse or fine. In this condition the cotton is ready to be put into the spinning wheel.

Spinning.—The spinning apparatus in Cuttack is similar to the wheel used in other parts of India. In a lecture delivered in 1852, Professor Royle gave it as his opinion that the Indian spinning wheel, though rude in appearance, is well adapted to the purpose. This remark may be applied to the wheels in Cuttack which do the work satisfactorily, and cost the spinner (*katuni*) the nominal sum of 5 annas. The chief parts of the machine (known as the *arata* in the Urya language) are the wheel and the spindle. These parts are so arranged that a swift revolving action is given to the axle of the spindle by means of a driving band which passes round the driving wheel. Cotton in the form of a *wick* or *spool* is presented to the point (*takuri*) of the spindle, and then spun into a thread, which is allowed to roll round the spindle. When the projecting point of the spindle is full, the spun thread is removed and rolled round another instrument called the *sootanati*, which is nothing but a small conical shaped frame of bamboo. When this is full, the thread is taken off, wound together in skeins, and is now ready to be used by the weaver. Spinning, as remarked by Mr. Collin in his Report on the Industries of Bengal, is altogether a domestic industry. Women follow the employment at home generally in their leisure time.

The amount of thread spun in a day is 1 Cuttack chitak, *i.e.*, 1¼ chitaks of 80 tolas weight.

Weaving.—When the cotton has been thus spun, it is made over to the weavers. In Cuttack, the largest number of them is to be found at Gulnagar, Jonkoti, and Kishenagar, and more or less in all villages. It is, however, to be noticed that the trade of weaving has all but completely decayed in the district. It is not uncommon to find many of this caste, who having entirely forsaken their professional calling, live solely by cultivation. Those who still work at the loom are forced to add to their income by taking service as coolies or agricultural labourers, when they have not the capital to rent land for themselves. Their manual labour cannot compete with European machine-made piece-goods either in fineness of quality or cheapness of price. The cloth made is stronger but much coarser, and is used only by the very poor classes, who would make one piece last throughout the year. Even they, however, now prefer to buy cheaper cloth, so that the local industry may be said to have really died away. The Collector of Cuttack in his report for 1879-80 remarks "that the proportion which country-made cloth in use, bears to European piece-goods is estimated approximately at one to three," but it must be observed here that these figures include the muletwist which weavers use to manufacture finer specimens of cloth. The country cloth manufactured exclusively from country thread bears an inappreciable proportion to European piece-goods. This is not to be wondered at, when a man who formerly used to make 6 annas profit from a piece of cloth measuring 12 hands, now gets 2 annas as his profit for the same, this low figure representing the earnings of a day of a family of three persons who would have to work the whole day to finish one such piece of cloth. Machine-made twist is purchased with the hope of meeting the demands of purchasers, and it is only a few families among the Bauris, Kandaras and other low castes who, unable to buy cloth, weave it with the thread spun by the women of the family from the cotton grown in their own fields. Besides these, there is also a small number of Telinga families in the Sadar station who, coming over to serve originally as coolies in the Irrigation Department, have, after the completion of the large irrigation works, taken to weaving.

Machine-made imported thread is found to be fine and even, and is accordingly used for the manufacture of finer and more expensive stuffs. Particularly so is this the case in Gulnagar in the town of Kendrapara, where fine cloth is largely woven from imported twist. This cloth goes by the name of *Gulnagar*, and is much prized by the wealthier natives of the district. Besides meeting the local demand, it finds its way also into the shops in the town of Cuttack, where it fetches a much higher price than the ordinary country cloth. About Rs. 30,000 worth of this cloth is reported to have been manufactured during one year (1890), the prices varying from annas eight to Rs. 20 per piece of 3 to 8 yards.

Process of weaving.—Warp laying.—The first process in weaving is to stretch out the warp or longitudinal threads. The skeins already described are unwound round a pyramidal reel, which spins on a spindle.

Wooden pegs or sticks, 6, 8 or more in number according to the size of the cloth to be woven, and about a cubit in length each, are then fixed on the ground in a double row, at intervals of about 2 feet, varying according to the dimensions of the cloth. The sticks being thus arranged, the thread is then skilfully passed by the warp layer through and round these pegs, so that they cross each other between the pegs. The weaver walks up and down with the spindle several times, until enough thread has been dropped between the sticks to make the required width of the cloth.

This whole process is called *loondikardha.*

Sizing.—The next thing to be done is to *size* the warp. A paste is made with rice gruel, and the thread is soaked in this to stiffen. It is then stretched out on trestles (*pania*) and brushed with the *kancha* (a brush made of *bana* grass) and allowed to get dry. The brushing is done along the threads, and takes away all inequalities, smoothing down the fibres and removing knots and superfluous *size.* When thus prepared, the warp is next taken to the weaving room, where it is put into the loom or *tanta* [made of palmyra palm or *sissu* (*Dalbergia latifolia*) wood], to be woven into cloth.

Weaver's loom.—The loom used in Cuttack does not differ from that used in other parts of Bengal. A hole is made in the ground, and the workman sits in front of this hole with the woof extending away horizontally from him, and supported at the end opposite him by a piece of wood resting on two posts. At the end at which the weaver sits is a wooden roller round which the woven cloth is wound as it is made. This roller is supported by two pegs which have different names, accordingly as it is on the right or left hand. The woof is tightened by a rope which runs round a peg at the extreme end of the loom and returns again within reach of the weaver, where it is fastened to a second peg. As the cloth is wrapped round the roller, this string is let go, and thus the further end of the woof slackened in its turn. In addition to these there are *heddles* which hang from the roof, and are worked by *treadles* which the weaver moves with his foot. These *heddles* alternately raise or depress the threads which are attached to them by loops, while a shuttle is passed and repassed with great dexterity over and under the threads. This is the ordinary mode of weaving cloth. When particular designs are made, there are some little differences in the details of the work and in the loom itself. Men do the greatest part of the work. The weaver's wife, however, assists in wrapping the thread round little bamboo *spools* placed inside the shuttle.

Tasar silk.—The silk industry of the district is confined to only two or three villages in the Jajpur subdivision, noteably Gopalpur and Balipatna, having been introduced here, like the cultivation of the betel-leaf, by a few families of Bengalis who emigrated into Orissa from Bankura some five or six generations back, and who have since been naturalized as Uryas. The local silk fabrics are made from wild *tasar* cocoons and are very little worn by the well-to-do classes, Berhampore silk, European broadcloth, and Cashmere cloth being preferred for their finer quality. The quality of the silk manufactured in these villages is very coarse, due no doubt to the inferior quality of the cocoons themselves, which are small, thin and light. They are obtained from silkworms feeding on the leaves of the *asan* tree (*Terminalia âlata*), the *sâlua* (*Shorea robusta*), the *barakuli* (*Zizyphus jujuba*),—all found growing in Sukinda and in the other hill States of the Garjats, such as Dhenkanal, Talcher, Keunjhar, and Mourbhanj. An internal trade is carried on in the cocoons, which are gathered in the jungles of the above Garjat States and sold to traders or weavers for the purpose of manufacturing silk. The worm, which goes under the name of the *tasar poka*, is reared by people of low castes, such as the Pans, Sahars, Bhumyas, and Kols. It is not necessary here to attempt a description of the insect in its various stages. Suffice it to say, that the cocoons spun by the worms or *kuas*, as they are called by the Uryas, are of a whitish colour and are gathered during the cold weather in the months of Pous, Magh, and Falgun. During the feeding period, the worms are liable to the attacks of different kinds of pests. Birds and ants also do a great deal of damage, and accordingly the rearers have to spend all their time in the midst of the trees to watch the worms. The cocoons themselves are sold at the rate of 300 per rupee. Samples sent by me to the Officer in charge of Silk Experiments in Bengal were valued by him at Rs. 5 to Rs. 6 per kahan of 1,280 cocoons. When brought home by the weavers, they are exposed first of all to the sun for two or three days, and then boiled in water for four or five hours, this being considered a sufficient solvent for dissolving the natural cement. While wet, the fibres are taken out and reeled on to a spindle called the *lata*. The silk is then made into skeins or *khias*. Twenty cocoons yield about one *tola* of wound silk. The next process is that of weaving, which is practically the same as the weaving of cotton already described. Where, instead of the natural white silk, coloured silk is manufactured, the fibre is dyed before weaving. The thread as a rule is badly made, and the dyeing of the fibre too is poor, and thus it is that the Urya *tasár* fetches a smaller price than the *tasár* in other districts of Bengal. It was told me by the weavers that 480 cocoons would be required for a piece of cloth 9 cubits long and 2¼ cubits broad, and that the price of such a piece would be about Rs. 3 or Rs. 4.

Blankets.—This industry, as has been already remarked elsewhere, is carried on only to a limited extent. After the wool has been cleaned and made quite fluffy, it is spun in the *charki* and woven in the *tanta* much in the same way as cotton.

Chanpat paper.—The manufacture of *chanpat* paper is carried on only by Muhammadans, but it may be said to have been given up practically for the last twenty years. All local cutcherries and offices, and even those in the Garjats, used this paper until it was superseded by the Bally paper. It was sold at the rate of five or six pice per quire. The following table gives the names of the manufacturing places, the number of families that worked at the industry formerly, and the number of families who work at it only occasionally at present:—

Names of manufacturing places.	Former number of manufacturers.	Present number of manufacturers.
Kendrapara ...	6 or 7 families ...	1 family.
Asureswar ...	5 or 7 „ ...	1 „
Harhiarpur ...	20 to 25 „ ...	2 to 4 families.
Padampur ...	20 to 25 „ ...	2 to 4 „

Kendrapara used to supply the Jajpur cutcherry principally; Asureswar and Padampur supplied Cuttack and Jajpur; and Puri obtained its supply chiefly from Harhiarpur. The demand is so nominal at present, that even those families who keep up the industry chiefly engage in labour and earn their living as petty traders in sheep and goats. The paper used to be manufactured, and I believe is still so, in small quantities in the Cuttack Jail.

At present, it is prepared generally from old papers and old canvas made of *chanpat* fibre. The paper is purchased mostly from the offices at the rate of Re. 1-4 per Cuttack maund, and canvas is bought at the rate of Re. 1-8 per Cuttack maund.

The implements used in the manufacture are:—

(1) The *dhenki*, *i.e.*, the pestle and mortar.—The beam is about twelve cubits in length. Eight men are required to work the implement, viz., two in the centre and three men on either side. Two men, besides, are stationed near the mortar to feed the machine. The two posts supporting the long beam in the centre, called *khulus*, are about one cubit in length, and the cross beam or *panki* is about one-and-a-half cubits in length. The pestle or *pahar* is about two-and-a-quarter cubits long. The mortar is made of *mungni*, and is placed in a pit varying from one-and-a-half to two cubits in depth and from two to three cubits in diameter.

(2) *Earthen tubs.*—These are about three to four feet in diameter and are buried in the earth.

(3) A bamboo rod about five cubits in length.
(4) A sieve made of split bamboo.
(5) The *pattah* (a small wooden stool).
(6) The *ballah* (a roller made of stone for polishing).

Cost of implements:—

	Rs.	A.	P.	Rs.	A.	P.
Price of 1 earthen tub or gamlah (large) ...				1	0	0
„ long wooden beam of dhenki ...	5	0	0			
„ mungni (akarmasila) ...	4	0	0			
„ iron ferrule of dhenki ...	1	4	0			
„ setting up of dhenki ...	3	0	0			
				13	4	0
„ sieve of bamboo ...				0	4	0
„ wooden framework for working the sieve				0	1	0
„ pattah (or stool) ...				0	3	0
„ ballah (or roller) ...				0	1	0
Total ...				14	13	0

Process of manufacture.—Old refuse paper is first steeped in large *gamlahs* or tubs of water, which are placed in pits dug in the ground. It is allowed to soak for four or six days, and then crushed by the hand, and made into a pasty mass. Old canvas is immersed in water to moisten it, and then crushed under a *dhenki* until beaten into a dust. Fresh fibres, when used, are similarly treated, being first exposed to the sun and cleaned, all small twigs being carefully removed, and then cut into small pieces on a *bointi* (knife) previous to being crushed. The dust, thus prepared, is put into a piece of cloth and then washed in a tank by two men to remove all extraneous matter. It is next sprinkled over with lime water and collected together into a heap. This heap is allowed to stand for eight or ten days, until all dirt and other foreign matter is removed by the action of the lime. Small portions are then taken out of the heap, and exposed to the sun to dry for a day or two. These are now taken a second time to the *dhenki*, sprinkled over with water and crushed. The whole mass is then mixed with the paper paste which has been already prepared; and the mixture is washed thoroughly to remove all lime water and ink stains. It is then introduced into a lage tub of water, where it is well stirred with a bamboo rod. Portions of the pulp are taken up now in a bamboo sieve. The water trickles through, and a layer of pulp is left on the sieve in the form of a sheet of paper. These sheets, as they are taken up from the water, are laid one over the other, and allowed to lie out for a day or two, when each sheet is removed and placed against a wall to dry. The dry sheets are then arranged in quires, and the edges cut off and planed. They are then rubbed over with a paste made of pounded rice, *harital* (sulphide of arsenic) being added sometimes to preserve the paper from insects. The sheets are now ready to be polished. This operation is done after the paper has been softened by being exposed to dew. The sheets are laid on a small wooden stool (*pattah*), and then rubbed with a stone (*ballah*) roller until the surface is smooth. The sheets are again bound in quires, and are then quite ready for sale. The paper thus turned out is very coarse but strong, and although not good for writing on, should make excellent packing paper:—

Expenditure for preparation of 64 *quires of paper.*

	Rs.	A.	P.
Cost of old canvas	0	8	0
Do. old paper	0	8	0
* Labour of making old paper into a paste ...	0	8	0
* Cost of working the dhenki (twice)	1	8	0
Lime, two seers	0	2	0
Wages of two more coolies	0	8	0
Total ...	3	10	0

The price of the above quantity of paper, being calculated at the market rate of five pice per quire, would amount to Rs. 5.

In the above, the items of work marked with an asterisk are calculated only at a valuation of labour, as the work is done by the manufacturers themselves. The work described would stretch over 15 days or more, so that it is difficult to ascertain the daily earning from this profession. The manufacturers say, they now scarcely get an anna each per day from the industry. Formerly as much as four annas could be earned by each man daily.

Lac work.—Lac bangles (*jow choories*) are worn in Cuttack chiefly by Muhammadan and Rajput women. The lowest number of *choories* worn in each hand by Muhammadan women is three, and the highest six, and by Rajput women three and nine. Little girls, a year or two old, also are made to wear one or two *choories.*

The principal material of which these *choories* are made is *jow*, or lac. To three parts of dry lac, one of red earth of the fields is added, and both are put into a *handi*, or earthen pot, and set on the fire, and the mixture is constantly stirred with a stick until it becomes of the consistency of paste. The melted matter, being well mixed, is then poured out on a flat wooden board, and when it has cooled a little, it is rolled with a wooden mallet into a stick. This stick or cylinder of prepared lac is then held up over a fire of coals kept for the purpose in an earthen pan (*chhelud*), and as it softens by the heat, it is again rolled backwards and forwards on the board and reduced to the thickness of an ordinary wooden pencil. Pieces of the required size are then cut off from this thin stick of lac, and each piece is held up over the fire and the two ends of it are joined. This is then set on a conical framework of wood, seven to eight inches long, tapering from three inches in diameter at the base to two inches at the apex. To the centre of the cone is attached a cylindrical handle about 16 inches in length, which is held in the hand while the upper framework is made to revolve over the fire. The *choori* is thus moulded into shape, and is smoothed with the blade of a knife. When it cools and turns hard, it is taken out and another piece of lac is taken up and the process is repeated. When five or six are ready, they are again put on the frame and held over the fire, and when they have softened a little, the first and the last *choories* are given a round shape and the intermediate ones are flattened down with the knife. Finally, a coating of lac coloured red, yellow, green or blue, according to choice, is put on each *choori*; and while the frame is held over the fire the *choories* are polished with the blade of a knife, and with the edge each *choori* is cut and detached from its neighbours. A thread of lac is then put round the edges of each *choori*, and small bits of glass are set round the middle. The first and the last *choories* are covered over with *panni* or *rángá* (tinsel) to resemble silver. The *choories* are then ready for use. Coloured lac used for the coating is prepared in the following manner:—

To three parts of lac, one of *harital* is added to make the colour yellow. For a red colour one part *hingool* (country vermilion) is added to three parts of lac, and for a blue colour one part of indigo is added to three parts of lac. Half of *harital* and half of indigo added to three parts of lac give a green colour. The colouring matter is mixed with water and ground on a stone (*sil*) until reduced to the consistency of a thin paste. It is left in this state on the stone, while the lac with which it is to be mixed, having been placed in a piece of cloth, is melted over the fire until it becomes so liquefied that it can easily pass through the cloth, when it is held over the stone containing the colouring matter and allowed to fall out in drops on the paint. The whole is then mixed with two sticks, and becomes coloured lac, and is wrapped round a stick and allowed to harden. In this way it is kept ready for use.

Coloured lac thread, referred to above, is made by drawing coloured melted lac into thread with a stick. This thread is put on the *choori* round the edges and represents a raised border.

Potter's work.—The *kumhar* or *potter* caste manufacture all kinds of earthen vessels, whether for domestic or general use. The following aphorism current among them points to the variety of articles turned out by them:—

> "Kumhara Chakra māti bhori
> Shay katia jonay, katia kori;"

i.e., "we potters fill our wheels with simple mud, but our productions are put to all kinds of uses." The vessels are all made by the hand, the potters displaying a considerable amount of ingenuity in their work. "A large wheel is placed in an horizontal position on a small and well lubricated pivot fixed strongly into the ground. On the centre of the wheel above the pivot, a quantity of prepared clay is deposited; then by means of a stick the wheel is made to revolve very rapidly, and sufficient impetus is imparted to it to keep it in motion for several minutes. Seating himself down on the ground before the wheel, and stretching his arms over, the *kumhar* manipulates the revolving clay into the shape intended, and having done so, separates it by means of a thin cord from the rest of the clay, and recommences the same operation, there being enough clay on the wheel for the manufacture of a dozen vessels or more. When the wheel slackens in speed, he places the stick in a hole near one of the spokes, and revolving it a few times forcibly sends it on again with its original speed. The vessels when made are burnt in a kiln."

The above description of the potter's work is taken from Mr. Sherring's account of the "Hindu Tribes and Castes of India." The process as seen by me in several villages in Cuttack resembles it in all its details. Measurements of a kiln of the kind referred to by Mr. Sherring were taken by me at Marsaghai. The kiln was made of the shape of a dome, having an opening only on one side to feed the furnace. The circumference was 57 feet, and the height 10 feet, and the number of vessels that could be burnt at a time was calculated to be about 160.

Sujangur work.—The *Sujangur* works in iron wire, which he buys from Manihari shop-keepers, who import it from Calcutta. This wire is soft, and the *Sujangur* draws it on a heavy wooden wheel to make it as fine as he wants. For making fish-hooks, he cuts the wire into the required length of the hook, then carves it with the pincers and a small hammer which he plies on a small iron anvil. The barb is then cut with a small file shaped like the blade of a knife, and a notch is also cut with the same instrument at the top end for fixing the line. The hooks are then heated on a coal fire and dipped in a pan containing water to harden them. The *Sujangur* repairs the framework of umbrellas and does all kinds of binding work with wire; he makes the wire finger-tips (*nakhi*) for playing the *sitar*. With a small awl (*bhŏwr*) he bores holes in thin plates of metal or wood. These are all his implements and his industry. One maker (named Guddadhur Das) in Cuttack is represented to make very superior fish-hooks, which are taken to Calcutta and other distant places for sale.

Under this head, it may be observed, there is another local industry carried on by some men of the *Bauri* caste. This is the manufacture of *fishing lines* with cocoon tasar. The tasar is unwound from the cocoon, and several strands of it, according to the length and thickness of the *line* required, are tightly twisted like a rope. This is done with the hand. It is then rubbed with a dye made of certain leaves and the sticky juice of a jungle fruit called *kendu* (*Diospyros melanoxylon*), and stretched to dry in the sun.

Turner's work.—All kinds of wood are used for this work, as well as buffalo horn, deer horn, and ivory. The industry with the latter materials is, however, very limited, there being but two or three shops in the town of Cuttack where the articles made from them may be had. Cuttack with Satkhira and Monghyr are among the most important places for the manufacture of small articles of horn. Very chaste designs are made in the Tributary Hill States, from where scent bottles, cruet stands, and *hookah* mouthpieces were sent to the Calcutta Exhibition. These articles were, however, made by the workmen of Cuttack, who are employed from time to time in the service of some of the Chiefs of Orissa to teach them the art. Ivory-carving is taught the Chiefs by the same men. The wood, horn or ivory is first cut with a saw (*karata*) of the required length, and then reduced to the required thickness with a *barsi* or adze. It is then placed on a lathe which rests on two supports made of wood. The thicker and open end of the spindle has a hole into which is fitted the article to be worked with. The spindle is made to revolve by means of a rope by one man, while the turner sits on the opposite side facing him, and with his large and small chisels (*kholas* and *chowras*) continues planing and smoothing the wood or horn. The grooves and indentations are made with gimlets (*ankuris*) of different sizes. With horn and ivory, the next process is that of polishing. With wood, colouring matter made with lac is first applied, and then the articles polished with dried palm leaves moistened in water. Walking sticks, chessmen, cups and other small ornaments are made in this way of ivory and horn. The variety of wooden articles is greater, consisting of sticks, legs for chairs, tables and bedsteads, rulers, handles for whips, stems for the *hookah*, spinning tops, and many kinds of toys and fancy ornaments.

Ornamental articles are also made by the turners from cocoanut shell and from the betelnut.

Carpentry.—Cabinet-making.—Although the carpenters in Cuttack are able to turn out pretty good articles when a sample is placed before them, they are very deficient in original designs, and their work generally, therefore, is more or less of a coarse nature. There is in fact nothing of ornamental carpentry in the district beyond the unique designs of gods and fabulous beings carved out in panels of doors and in boats. In the villages, there is the usual body of *barhais*, who prepare agricultural implements, carts and articles of furniture used by the natives of the country. The earnings of a good carpenter in town amount to about 8 annas per day, but a village workman scarcely earns more than 4 or 5 annas daily.

Other industries.—Besides the above, the only other works of art, if they may be so called, are certain specialties in the way of toys and ornaments. Among these may be mentioned the *darah*, which is a tambourine, the earthen framework of which is done by the potter, and the drum parchment put on by Muhammadans. Imitations of porcelain toy figures of men and animals, goblets, *chillums* and images of Hindu gods form the ornamental work of the potter. Ornamental baskets are also made of a golden-coloured straw and used as work-baskets known as *kainchadala*. *Gut* is also manufactured by low caste *Pans*,' the thinner strings being used for musical instruments, and the thicker by weavers and cotton spinners. A very inconsiderable quantity of jute is prepared and made into ropes and gunny bags, chiefly for home consumption. Stone carving is to be seen also in a few villages, but as a rule is very rough.

Suggestions for improvement.—The articles turned out by the Uryas are not very chaste. Much might be done in stimulating the local manufactures in the district, by establishing small museums in the subdivisional head-quarters, and offering prizes for good workmanship. As in other parts of Bengal, a good deal of time is lost in hand work. ' Taking now the brass work of the district. If a few simple machines could be introduced without offending the conservatism of braziers, a great saving could be effected of hand labour. Of these, the most important would be the introduction of the use of *dies* and of a hydraulic press to beat the vessels into proper shape. The braziers as a rule are wealthy, and could afford probably to buy the machines, and thus save all the labour necessary to beat the metal into the required shape on the anvil. Cotton manufacture tells the same tale. The weaver's profession is dying out gradually. Hand-spun thread is rough and uneven, and is unable to compete with machine-made thread. Hence it is that machine-made twist is largely used by those who still weave in their efforts to meet the demand against European goods. Until machines can be introduced, there seems to be no hope of giving any substantial stimulus to the manufacture of fine cloth in any of the districts of Bengal. In Cuttack itself some good may be done by introducing fresh varieties of cotton. A beginning has already been made in this direction by me in the Madhupur estate, where seeds of the *khaki-coloured* cotton have been distributed among the raiyats. Although, according to some, the fibre of this variety is not considered to be as strong as that of the indigenous varieties of Bengal, I found that the cloth manufactured from *khaki* cotton was much stronger than that of the ordinary local manufacture, and such too was the opinion of the local weavers and other raiyats who preferred the *khaki* cloth to their own on account of its stoutness and colour.

With regard to *tasar* sericulture, considering the inexpensive process of rearing the cocoons, and the fact that the worm is indigenous to the hills on the western frontier of the district, it seems possible that if experiments were encouraged, and rewards offered, so as to bring the industry to notice, others besides the low castes of the hills may be induced to rear the cocoons, and thus develop the *tasar* industry. Such experiments may be introduced by the Officer in charge of Silk Experiments in the jungles of the Wards' and Government estates of the district.

The horn and ivory work of Cuttack, which is confined only to two, three, or four workmen, require only to be brought to notice to be appreciated, and for this, as for all the ornamental industries, the best stimulus that can be given at present is, as already remarked, by the establishment of a museum and the offer of rewards by the influential inhabitants of the district.

CHAPTER VIII.

LIABILITY TO FAMINE, FAMINE WARNINGS.

Droughts.—In Cuttack, droughts have been brought about by the absence of local rainfall. The whole district may be described as a large deltaic tract, where the differences of level between the high and low-lying lands is so slight that in the event of any scarcity of rainfall all parts of the district are equally affected. The low-lands are not sufficiently below the level of the up-lands to retain moisture for any considerable time after the rains have ceased, and in years of drought the crops grown on them do not in any way compensate for the loss of those which may be burnt up on the arid higher levels. A drought, therefore, is liable to affect Cuttack more seriously than those districts where, on account of the great difference of level between the up-lands and the low-lying tracts, the sterility of the former may be compensated by the increased fertility of the latter. Since the droughts, however, of 1830-31, 1833-34, 1836-37, 1839-40, 1840-41, and 1865-66, all of which caused more or less alarm, and the last of which brought on the great famine of Orissa, provisions have been made in the irrigation works to supply the cultivators with water, so that the district may be now said to enjoy comparative immunity from danger, even when there is a protracted cessation of the rains. As a matter of fact, of late years there has been no ground for any great anxiety on the score of a drought, although the deficiency of rainfall has in several years seriously affected the outturn of crops.

Floods, storm-waves and cyclones.—Dr. Hunter rightly points out that floods have been the scourge of the province. Freshets in the rivers begin usually in the middle or end of June and continue up to October. In July, August, and September, when the rice plants are in the vigour of their growth, or in flower or ear, the highest floods occur, by which the embankments get breached, the rice-fields inundated, and the crops materially damaged. Records are available to show that in Cuttack, they have damaged crops to a greater or less extent from the year 1830 up to the present date. From Volume XVIII of the Statistical Account of Bengal, it will be seen that floods caused a general destruction of crops in 1831-32, 1834-35, 1848-49, 1851-52, 1855-56, 1857-58, 1862-63, and 1866-67.

In the flood of 1866, the depth of water in the inundated tracts varied from 3 to 15 feet. In Bargaon, where an area of 2,995 acres was affected, the land at different places was under 4 to 15 feet of water for a period of 15 to 45 days. In some parganas, the water did not subside till quite 60 or 70 days. The total area of the inundated tract was 259,212 acres with a population of 489,341 persons. The only parganas that were not affected by the flood were Apila, Chhedra, Dalijora, Derabisi, Karimul, and Khandi. Although no lives were lost in the inundation, the number lost from the combined effects of the flood and the famine referred to later on was computed at 378,009, and the amount of paddy lost was estimated, according to the report of the Inundation Committee, at 78,11,247 maunds valued at Rs.12,17,35,644. After this great flood, the district was visited by a cyclone in October 1867, but this did not at all seriously add to the distress which had been prevailing since the previous year.

In 1868-69, the Brahmani and Baitarani rose to a great height in June, especially the latter, which carried away many miles of the Trunk Road and inundated the whole tract of country between the Brahmani and the Salindi in Balasore. Fortunately, however, although the rice crop was short in many localities, it was found generally sufficient for the district.

No damage seems to have been done to crops in 1869-70 and 1870-71 by floods or storms. Storms, however, were frequent in April and May in 1871-72, and were followed by floods in the Brahmani in July; but the crops were not much affected.

In the first half of July (1872-73) there was an excessive flood, reported at the time to be the highest known since 1855; and probably the highest recorded up to that period. Cuttack city was in imminent danger, being only saved by the energy of the local officers. It was cut off from all communication with the surrounding country. The canals and embankments of the district were seriously injured, and the picture presented of the country was a vast sea of water stretching from Cuttack to the coast, dotted here and there only by a few village sites, which, from their higher level, had escaped the inundation, forming a temporary shelter for the people and cattle, who had huddled together there in the greatest distress.

The year 1873-74 was marked by the absence of destructive floods or storms.

In July 1874-75 the rivers Brahmani and Mahanadi rose in flood, damaging the crops on the lowest lands only in certain parts of parganas Aul, Tisaniya, Kalamatia, and Kanika. The general prospects of the crops in the district remained unaffected.

Storms in June and July (1875-76) were succeeded by trifling floods, but no damage was done to crops.

No mention is made of any floods or storms in 1876-77.

The year 1877-78 was marked by a very high rise in the river Baitarani in the month of July, by which the protective embankments were breached in many places, and considerable damage done to the crop and cattle of the adjoining villages. The second range of the High Level Canal was seriously injured, and all the village roads were submerged, as well as the Calcutta main road in some parts. No human lives, however, were lost.

In 1878-79 there was an equal and even distribution of rainfall, and the district enjoyed an immunity from floods.

In 1879-80 the floods were high in the Mahanadi and Brahmani and their branches. In the Sadar subdivision the actual damage done to the crops was not serious. In the Jajpur subdivision, much damage was done in pargana Alti by the overflow of the Brahmani and by a breach near Janapur in parganas Bari and Olash. Over a large tract of these parganas 12 annas of the crops were destroyed, chiefly by the caterpillars which were brought on by the flood. Kendrapara was also affected by these floods in the month of August. The villages round about Indpur suffered greatly, where many houses were knocked down. The *sarad* crop failed completely in parts of pargana Romito. Killas Aul and Cheddra and parganas Tikan, Derabisi, and Utikan had their share of the inundation. The *sarad* crop for the year was a very poor one, and people had to depend on imported rice, large quantities of which were brought in from those parts which had not been reached by the flood. The river began to rise early in August at the rate of six inches a day, increasing to over a foot by the night of the 13th, after which the water began to fall, having sunk to a depth of 9½ feet by the 24th. The next day, however, the river began to rise again and continued to rise till the 2nd of September. The third and last flood commenced on the 13th, and, with fluctuations of rise and fall, lasted till the 1st of October. Breaches were made in the zamindari bunds both by the Brahmani and by the Chitartala, which swept away many houses; but the losses were still greater in the open and unprotected parts, where for seven days more the people had to confine themselves to their houses. There was but one life lost, but 1,753 houses were completely destroyed, the number partially damaged being estimated at 965. Cattle suffered greatly, being starved for want of fodder.

In 1880-81 the district was again visited by floods. The chief damage in the Sadar subdivision was in pargana Binahar, which was caused by breaches in the Alanka embankment. Kendrapara was affected by the rise of the Mahanadi, Brahmani, and Gobri; but the damage done, as compared with that of the previous year, was considerable. The first of these rivers began to rise on the 28th of June, the maximum height being reached in the course of a week. The Brahmani inundated a portion of the country three months later in September; while the Gobri, although a small river, added to the losses incurred by rising to an unprecedented height, submerging a great portion of the fertile country lying along its course, and totally destroying the paddy crop thereon. The agricultural season of the year, however, turned out a very favourable one. The damage done by the floods was fully compensated in many cases by the silt left behind on the submerged lands.

In the following year in 1881-82 there were repeated floods in the rivers in the north of the district, from July to the beginning of September. The tract chiefly affected by them was a long strip of land lying between the Brahmani on the south and the Baitarani on the north. The whole of the *sarad* crop here was swept away. Killa Aul suffered most by breaches in the Kharsua embankments. In Kanika, the greater portion of the crop was destroyed, and the following parganas were more or less affected:—Ahiyas, Bantara, Baran, Baruya, Dolegram, Jodh and Olásh. The breaches in the Brahmani also affected the western portion of the district on the left of the Trunk Road. The continuance of the floods till October prevented a second sowing of rice, while at the same time the *birhi* crop suffered severely from the freshets of this month. Under such adverse circumstances, many had to leave their villages and seek employment in Calcutta and elsewhere.

For the next two years from 1882-84 the district enjoyed an immunity from these floods.

In 1884-85, the crops unprotected by embankments, were destroyed in Banki, as well as along the banks of the Katjuri and Alanka. In the Kendrapara subdivision, the crops in pargana Utikan and in Killa Aul suffered from the inundation caused by a cut in the protective embankment of the Brahmani. A 10-anna crop was harvested in the district.

The year 1885-86 was marked by a severe cyclone on the 22nd of September, which swept away houses, crops, and trees in many parts, and led even to the loss of cattle and human life. The storm was keenly felt in the Jajpur and Kendrapara subdivisions. In the former subdivision, there were no less than 2,447 villages affected and nearly 50,000 houses destroyed. Two hundred and ninety-four human lives and 2,973 cattle were reported to have been lost, and the probable amount of damage done to crops was estimated at Rs. 72,601. In the latter subdivision, Kaldip and Kerara suffered the most, Kaldip having all its crops and Kerara three-fourths of its crops swept away by the storm-wave which accompanied the cyclone. The loss of cattle throughout the subdivision was estimated at 10,000 roughly, of which no less than 7,000 belonged to Kaldip and Kerara alone. The loss of life was estimated at 5,000, accounting thus for the decrease in population in most of the villages of the Kanika estate. In one pargana alone, viz., that of Utikan, the area of cultivation affected by the storm-wave was about 14,000 *máns.* Relief measures were taken, rice being sent down for distribution only to the poorest. Two depôts were established, viz., at Hansua and Rajnagar, from where allowances were doled out at the rate of ½ a seer for each adult and ¼ seer for each child. The land in Kaldip, lying between Rajnagar and the sea face, which, before the cyclone, was perhaps one of the best rice-growing tracts of the estate, was converted into a brackish waste. During my tour, I was told that some villages here had disappeared altogether, while most were reduced in size. The destruction of certain houses in the several villages led to the extinction of distinctive castes in many of them; so that not a few *bustees* may be now seen wanting in certain castes of people whose presence and services are indispensable to a perfect village community. The soil in these parts is still so saline in its character that new settlers are deterred from filling up the gaps which now exist, and the people are destined to be content with their necessarily imperfect village organization. A natural sequence of this state of affairs is that a large portion of land has to lie without cultivation; and although, since the cyclone, many fields have been reclaimed, the fear of another storm-wave has such a hold on the minds of the raiyats that they are naturally averse to exerting themselves in right earnest. Low rates of rent, however, and fuel free, may perhaps be inducements to them to regain their former condition. It must be noticed that *takavi* advances had also been made to the sufferers after the cyclone, but no immediate good resulted, as would appear from the remarks made by the Subdivisional Officer in his report for Kendrapara for the year 1886-87. He writes:—"The people, notwithstanding the advances made to them, have done very little towards rebuilding their houses, and hardly any have purchased plough-cattle." The cyclone of 1885 was also accompanied by a tidal wave which swept over False Point Harbour, knocking down all houses before it, and submerging Jambu, as it rolled along in an unbroken wave over Kaldip and Kerara. The effect, adds the Commissioner, "of the tidal wave was suddenly to create a sufficient depth of water all over the harbour to float large steamers over shoals where ordinarily there is a depth of only a few feet of water. The sudden fall of the water landed the ships and steamers which had drifted from their moorings on the shoals where they now lie, and landed the cargo barges in the midst of the jungle, and in the most extraordinary places, the boatmen having no command whatever over their boats, and unable to distinguish, amidst the wild waste of waters, the creeks from the submerged land." At Jambu itself, out of a population of 130 souls in the village, only about a dozen were saved, the village site on being visited being found covered with corpses of men, women, and children, and the dead bodies of cattle and deer which were floating in the creek before the village. Between Jambu and the Brahmani, all along the Hansua creek, the scene was one of perfect desolation, with trees uprooted and houses crushed into a confused mass, and with hardly any signs of animal or human life whatever.

In the following year (1886-87), there were no floods or storms, and the outturn was reported to be larger than in any season during the previous eight or ten years. In May 1887, however, the district experienced another cyclone, but no very great damage was done, only a few houses being destroyed and a few cattle killed in chaklas Aul and Ganja. The heavy floods of the next year during August and September, and a cyclone in the latter month, injuriously affected the crops in many parts of the district, so that the average outturn was estimated at only 9 annas. Distress was felt in Banki in consequence of this small outturn and scarcity of the food-supply, necessitating the provision of relief works.

The cyclone of 1888 was followed by another cyclone in November of the next year, when the rabi crops were seriously damaged just as they were about to germinate.

The last disaster of this kind which has visited the district was in June 1890, when a storm-wave affected a considerable part of the Kujang estate which, since the tidal wave of 1885, had been more or less subject annually to the inrush of sea-water. Every year since this tidal wave, there had been some damage done to crops, while some tracts were being rendered unfertile by the deposition of saline matters. Matters, however, reached a climax in June 1890, when another wave passed over this portion of the estate, completely destroying the crops in a tract extending from the Keabag to Gagua. Here the supply of food-grain was found to be all but exhausted, the standing crops had been swept away, and all existing tanks and wells were filled with brackish water. The severity of the distress was all the more keenly felt following, as it did, the loss of cattle in the previous year by *rinderpest*, which carried away more than 75 per cent. of buffaloes and cows, so that an obstruction was put to the very last resource under such circumstances—to keep alive by the sale of cattle. Four months after this tidal wave, it was reported by the Manager of the estate that nearly nine-tenths of the people in the affected tracts had no grain in their houses, nor had they the means of purchasing grain. Many of them left their homes to seek employment elsewhere, the old and decrepit being left to their fate without any means of support. An estimate has been sanctioned for constructing bunds which will protect an area of 12,000 *máns* of this tract liable to sea-water inundation. They will run along a length of 27 miles in Chakra zilla and in mauzas Tankibellary, Moladihi, Kansar, and Tarapodo.

Blights.—Destruction of crops by blight, whenever it has occurred, has been restricted to limited areas, and has not been of sufficient significance to need any further comment.

Famine warnings.—(*Vide* page 148, volume XVIII, Statistical Account of Bengal.)

History of past famines.—The history of the district, like that of the whole province of Orissa, is intimately connected with the calamities and disasters brought on by great famines. Records show that these terrible famines occurred in the 14th, 15th, and 16th centuries of the Christian era, but the memory of these has now entirely faded away. As in other parts of Bengal, the great famine of 1770 was felt throughout Orissa, and later on in 1774-75 there seems to have been another great scarcity. Nothing can be gathered from any record to show that the famine of 1783 affected the district at all; but ten years later, in 1792-93, another great famine appears to have visited the country. In the present century, the heavy calamity which stands out to the front is the famine of 1865-66. For upwards of twenty years before this, the district had enjoyed an immunity from any unusual suffering arising from calamities of season, and when the distress overtook the people, its intense and desolating character was all the more keenly felt. Although now a quarter of a century has passed, and the people have to a great extent been able to retrieve the heavy losses then sustained, yet still the sad remembrances of the sufferings of that time seem to have been handed down to the present generation. The scarcity of food was greater, and the prices of food higher beyond all precedent, and yet immediately before the famine, even so late as August 1865, the prices in Cuttack remained easy, and the prospects of the crops remained good even to the end of September. The entire cessation of rain in the month of October brought matters to a crisis. The deficiency of rainfall seriously affected the outturn. Owing to insufficient moisture in the soil, the *sarad* crop (winter rice), on which the population mainly depends, was not able to mature to perfection. The greater portion of the crop on all the higher lands perished from drought. Prices began to rise, matters looked extremely serious, the whole district was in a panic, and sales began to be stopped at all the regular marts. Distress now began to be distinctly felt, although it had been hoped that the stock of food in the district would have been sufficient to feed the population. Relief Committees were formed, meetings held, and subscriptions called for in December 1865; but no relief measures seem to have been taken immediately, as it was generally believed that, even if there were a deficiency in grain, it would be supplied by private importations, and that relief in money would enable the poor to supply themselves with food. The Irrigation Company had already retarded the evils of distress in the district by coming forward with their assistance, but a famine in spite of this seemed imminent. In February, rice began to sell at famine rates, viz., at nine to seven standard seers per rupee, and rose in April to 6½ to 5½ seers per rupee. It now became evident that the people were suffering from actual starvation, and prompt measures began immediately to be taken by Government for the importation of rice. At the same time, public and private charities opened, and the Relief Committee also commenced regular operations. In the month of June, the rate at which rice was being sold was 3½ seers per rupee, *i.e.*, at eight times the average price. The rains commenced in this month, and continued without doing any harm up to August, when, just as the early biali rice (*aus dhan*) was ready to cut, unusually prolonged and heavy rains caused the rivers to rise, and on the 11th of August occurred the highest flood on record for many years at Cuttack, particulars of which will be found in the preceding paragraphs of this chapter. During this flood and heavy rainfall, the mortality became very great, due mostly to exposure and cholera on an already weakened and starved population. In most of the low-lying lands, especially in the vicinity of the embankments breached by the unusual rise of the rivers, the *biali* crop (autumn rice), which would have been reaped within a fortnight, was almost entirely destroyed, and the young cold-weather crops also suffered much from protracted immersion. In September, matters began to look a little better, due to the ripening of the small early crop of rice in tracts which had not been inundated, but distress still continued, and shortness of rice was felt all through October. It was not till November, when the new crop began to come into the market in considerable quantity, that the general famine may be said to have come to an end.

Having thus given a general sketch of the cause of famine and the loss of crops, it would be well now to notice in detail the measures that were taken to afford relief.

Relief operations.—The means of mitigating suffering, as laid down by the Board, before famine actually visited the country, and which were subsequently actually adopted by Government, were—

(1) The publication of official prices-current.
(2) The provision of labour for the poor by public works.
(3) The exercise of private liberality through the agency of local Relief Committees.
(4) A liberal expenditure in Government estates, and the use of every possible means to induce landholders to follow the example.

The Irrigation Company.—In the early part of the famine season, as has been already noticed, the Irrigation Company opened out relief works by offering employment to large numbers in the town of Cuttack and along its lines of works running eastwards and northwards. Their rates of pay were liberal, and at first the Company also imported rice for the use of its labourers.

The average daily number of labourers employed in each month from January to June 1866 is given in the subjoined statement:—

Month.	Average number employed daily.
January	14,666
February	10,763
March	7,808
April	9,146
May	8,120
June	5,238
General average	9,290

In the rainy months from July to August, the work was for the most part stopped by the season.

The Relief Committee.—With regard to the measures adopted by the Relief Committee, it may be noticed that they actually commenced their operations on the 27th of April, when they purchased rice from zamindars and merchants, who sold it to the Committee at very much lower prices than the market rate. This rice was distributed in the shape of cooked food to the indigent at an *unnachattra* in the town under the superintendence of the Civil Surgeon. The number of paupers fed here rose from 300 and 400 in April to 10,000 or 12,000 by the end of May. The allowance per head was fixed at 6 chitaks of rice (local weight), besides vegetables or pulse. Care was taken to restrict the distribution only to those who were unable to earn a livelihood for themselves. These operations for giving gratuitous relief were first opened only at Cuttack, Jajpur, Kendrapara, and Taldanda, but they began extending gradually, until eventually there were no less than 43 centres for the distribution of cooked food. In carrying out this work, the Committee availed themselves largely of the services of volunteers, such as the officers of the Irrigation Company, missionaries, and in some instances of zamindars.

A quantity of rice was also sold by the Committee at cheap rates, such sales being restricted by Government orders only to such persons as might be specially admitted as entitled to such a privilege.

The Committee also employed on light labour those who were capable of doing something, although unable to do such a day's work as would earn a subsistence in the ordinary market. Their remuneration was to be a daily portion of food from the Relief Committee's centres. The system adopted and the co-operation which the Committee received from the Irrigation Company and the Public Works Department is thus described by Mr. Kirkwood, the General Relief Manager:—

"At each centre, all those capable of doing light labour are now employed. If any Public Works or Irrigation Department works are going on in the neighbourhood, they are made over to work on these. They receive raw rice as pay. This rice is given by the Relief Committee, and the Department credits the Relief Committee with the actual value (at their ordinary rates) of the work done by these *kangalies.* Each labouring adult now gets 12 chitaks of coarse rice or 8 chitaks of fine rice.

"This allowance of rice they do not entirely consume, but sell or barter some of it for other commodities. This transaction is not carried on in the *moodies'* shops, but with the villagers in general. The amount of relief thus afforded is considerable and widespread.

"When there is no departmental work in the neighbourhood of a centre, those capable of doing work are employed in cleaning the village roads and such like useful work. In such case, they get their two meals of cooked rice per diem, it being reasonably feared that unchecked powers of giving raw rice would open to the *muharrirs* a door for peculation."

The following table, which compares the relief given in the last week of each month, compiled from a statement originally furnished by Mr. Mc Neile, will show at a glance the extent and nature of the operations undertaken by the Relief Committee:—

Last week of	Number of centres in operation.	Number of bags of rice given for gratuitous relief.	Number of bags sold at cheap rates.	Daily average number of persons relieved.	Number included in the previous column who did light labour.
June ...	4	54	113	1,301	220
July ...	23	258	628	8,164	1,665
August ...	32	736	821	20,562	5,503
September ...	41	1,793	1,374	32,000	15,000
October ...	43	2,556	841	33,210	13,449

At every centre shelter was given to paupers, clothes largely supplied, and in some places mattresses provided of gunny cloth stuffed with straw.

Government Relief.—While the sale of rice was being carried on by the Relief Committee, Government also commenced its sales under the organization of Mr. McNeile. Its object in thus entering the rice market as a trader was to supplement and not to supplant the small private trade which already existed. At the same time, however, in order to check combination among these tradesmen, it determined to fix its price slightly below the current market rate, and at the same time it limited the quantity to be sold to one rupee's worth daily to each applicant. The number of shops thus opened by Government was always limited by the supply of rice.

Relief was also afforded by Government in the shape of public works, which were of two kinds, viz., works executed by the officers of the Public Works Department, and those supervised by district officers.

The works executed by the Public Works Department were—

(*a*) Remodelling the Trunk Road between the Mahanadi and Baitarani rivers (north-eastern part of the district).

(*b*) Metalling the Cuttack Trunk Road (north-eastern part of the district).

(*c*) Improving and opening out permanently the Cuttack and Sambalpur Road (north-western part of the district).

(*d*) Raising the Kendrapara and Patamundi Road (eastern part of the district).

(*e*) Completing the earthwork of the Taldanda Road (eastern part of the district).

(*f*) Sundry minor works over the whole district.

(*g*) Repairs.

The total expenditure incurred in these from the commencement of the distress in October 1865 till its end in November 1866 was Rs. 1,27,545. The labourers employed were, with few exceptions, remunerated by task or piece-work under petty contractors, so far as roads and embankments were concerned, and it was on these that the largest number of workmen were attracted. No daily or other register of the work-people was kept, so that no figures, even of approximate accuracy, are available to enable one to form any idea of the number which was actually employed in these works.

Besides these Imperial works, during the same 14 months the sum of Rs. 13,585 was expended on works carried out under the supervision of the district officers.

Situation of relief centres.—The relief centres themselves were scattered all over the country instead of being centralized in a few large depôts, being arranged as follows:—

(1) In or immediately round the town of Cuttack.

(2) On the Cuttack and Kendrapara Road.

(3) On the Cuttack and Calcutta Road.

(4) Within the triangle formed by the boundary line of the Puri district on the south-west, the Bay of Bengal on the south-east, and the Mahanadi on the north.

(5) In the Kendrapara subdivision, in the tract bounded by the Mahanadi on the south, the Bay of Bengal on the east, and the Brahmani on the north.

(6) In the north-eastern corner of the Jajpur subdivision.

This system had the advantage of keeping the people near their homes, so that, when famine subsided, it was found possible to get labour, which would not have been available had they gone off in large masses to a few big central depôts.

Tracts affected by the famine of 1886.—The low lands towards the coast suffered the greatest distress, as the drought and scarcity which was felt towards the earlier part of the year was followed by high floods in August, which, making breaches in the embankments, or overtopping the *bunds*, inundated the whole of the seaboard tract, destroying both the autumn and winter rice crops. The part of the district thus affected included Killas Aul, Kujang, Kanika, Bishnupur, and Harishpur, and parganas Olabur, Utikan, Tiran, Tikan, Benabor, and Khundi. On the Katjuri, parganas Sailo, Saibir, Katiya, and Marichpur were similarly affected. In all these parts, which amounted to one-fifth of the culturable area of the district exclusive of jungle and waste, the loss was estimated at 12 annas. Heavy loss was also sustained in parganas Bakrabad, Baharupa, Kodinda, Shahabad, Shujanagar, Katai, Deogaon, Alti, Hariharpur, and Joyrabad.

Taking the subdivisions separately, we find that in the Kendrapara subdivision the heaviest loss was felt in the parganas of Tikan, Utikan, Aul, and Kujang; the crops in the low-lying parts of Tikan being below the flood level of the rivers, were almost totally destroyed by the great force with which the waters rushed in on them. The loss was more or less severe also in Mobakhord, Suknai, Chaudakolat, and Tiran. The intensity of the distress in the subdivision was observable from the fact of children and women of the upper castes, such as Gwallas, Khandaits, Mahantis, and even Brahmans, actually working in the light-labour gangs on the roads, which their caste prejudices would never have sanctioned or permitted had they not been goaded on to it simply to keep themselves alive.

In the Jajpur subdivision, the parganas to suffer most severely from flood were Kayama, Baran, Bautara, and Hatimunda. Indications of distress were observable all over the district, in that during the famine year 1,240 deeds of sale of land were executed, as compared with only 479 of the previous year. Many rent-free holdings changed hands. Such was the scarcity of food that brass pots, gold and silver ornaments were being exchanged for grain at mere nominal value. Distress was also reported by missionaries and engineers from Khunditar, Benahar, and beyond Kendupatna towards Atabari.

Mortality.—It was roughly estimated that the mortality was one-fourth or one-fifth of the entire population, deaths being most common among day labouring classes, such as Bauris, Tantis, and Domes, who had no reserves either of money or grain to fall back on.

Tracts liable to famine; their area, density, and population.—In the annexed district map, the tracts that are most liable to famine are indicated in colour. The numbers given in the subjoined statement correspond to those entered in the map and show the area of each tract:—

No.	Area in square miles.	No.	Area in square miles.	No.	Area in square miles.
(1)	... 5	(10)	... 8	(19)	... 15
(2)	... 7	(11)	... 1½	(20)	... 25
(3)	... 2	(12)	... 1½	(21)	... 15
(4)	... 4	(13)	... 1½	(22)	... 35
(5)	... 2	(14)	... 120	(23)	... 20
(6)	... 12	(15)	... 25	(24)	... 25
(7)	... 6	(16)	... 20	(25)	... 45
(8)	... 8	(17)	... 20	(26)	... 100
(9)	... 8	(18)	... 15		
				Total ...	546½

In addition to the areas in the above statement prepared by the Collector, there is another tract of low-lying land in the Kendrapara subdivision, which the history of past famines would show to be peculiarly liable to famine, including portions of Tikan, Utikan, Aul, and Kujang. The population of these 546 square miles being estimated at 445,198, the density of the population per square mile in the famine tract would be 815·38.

Cause and special liability to famine.—Drought and floods, as has been already remarked, are the causes of famine in Cuttack.

Relief works.—Mention has been made already of relief operations and the situations of relief centres during the great famine of 1866. With regard to the works which may be fixed upon as possible future famine works, I cannot do better than quote from the abstract statement prepared by the Agricultural Department from returns received from the district in 1891-92. These works are divided into three classes, viz., (*a*) Professional agency works, (*b*) Civil agency works, and (*c*) Agricultural works. Under the first head it is estimated that 45,215 labourers may be employed for 163 days; for civil agency works the number of persons to be employed is given as 2,612 and the period of employment as six months; and for agricultural works the number of labourers is fixed at 18,335 and the period of employment six months.

The works themselves include distributaries, flood embankments, railway and district roads, construction of bunds, digging of tanks, wells, &c. I may add here, that a system of State-aided emigration would also do much towards affording relief in times of famine. The cost of thus relieving the congested parts of the district would, I believe, hardly be more than that incurred by Government in any kind of relief works.

CHAPTER IX.

SECTION 1.

TREES YIELDING TIMBER.

In the following list is given the names of the most important timber trees found in Cuttack. The vernacular and scientific names are given in each case, with a short description of the timber itself:—

Urya name.	*Botanical name.*	*Description and remarks.*
(1) Achu	Morinda exserta	Wood hard. Used for plough handles.
(2) Amba	Mangifera indica	Wood is sometimes used for planking or for door frames and handles of ploughs. Weight of a cubic foot varies from 40 to 48 lbs.
(3) Amra	Spondias mangifera	Wood soft and light and of very little use. The colour is light gray. Under water it improves, becoming hard and durable.
(4) Arjuna	Terminalia arjuna	Dug-outs and water-troughs are made from this wood, also carts and agricultural implements. The weight of a cubic foot is about 57 lbs.
(5) Asan	Terminalia tomentosa	Wood is dark brown variegated with streaks of a darker colour. It splits very much, however, unless thoroughly seasoned, and improves by being kept immersed in water. It is used for house building, carts, *dhenkis* and ploughs. The weight of a cubic foot is 71 lbs. Silk-worm is fed on the leaves, and lac sometimes reared on the branches.
(6) Bahara	Terminalia belerica	Wood white, rather soft and seldom used.
(7) Baudhan	Ougeinia dalbergioides	Wood tough and hard. Used for agricultural implements, cart-wheels, and occasionally for furniture and building. The weight of a cubic foot varies from 55 to 60 lbs.
(8) Baunsa	Bambusa arundinacea	Bamboo is extensively used for house-building and fencing and propelling boats.
(9) Bela	Ægle marmelos	Wood hard. Used for the posts of houses and for the axles of carts.
(10) Chara	Buchania latifolia	Wood fairly durable if kept dry. Used for cattle yokes and in building. The weight of a cubic foot varies from 30 to 36 lbs.
(11) Dhaman	Grewia vestita	Wood strong and elastic. Used for handles of axes.
(12) Dhaura	Anogeissus latifolia	Wood highly valued on account of its great strength and toughness. It splits, however, in seasoning, and unless kept dry is not very durable. Used for axe-handles, poles for carrying loads, ploughs, and posts of houses.
(13) Dholanku	Alangium lamarckii	Wood used for pestles and mortars, axles and door frames.

Urya name.	*Botanical name.*	*Description and remarks.*
(14) Gambhari	Gmelina arborea	Wood light, durable and easily worked. Highly esteemed for furniture; also used for planking, palkis, boats, boxes, toys and packing cases. Weight of a cubic foot is about 40 lbs.
(15) Ghoranima	Melia azedarach	A large useful timber tree. Heart wood is red. The wood is used in building huts.
(16) Giringa	Pterospermum suberifolium.	Wood is whitish and almost too soft to be of much use. Domestic utensils are made of it, as well as the doors of palkis. A cubic foot weighs about 44 lbs.
(17) Jamu	Eugenia jambolana	Wood reddish brown, hard, rough and rather close-grained. Used sometimes for agricultural implements. Weight of a cubic foot is about 48 lbs.
(18) Kanchan	Bauhinia variegata	Wood of a brown colour. Sometimes used in building huts.
(19) Kasi	Briedelia retusa	Found chiefly in *salua* forests. Wood heavy and of a brownish colour. Used chiefly for cattle yokes and agricultural implements.
(20) Kendu	Disospyros melanoxylon	The outer wood is dark red, and is used sometimes for building.
(21) Khaira	Acacia catechu	Wood hard and of a reddish colour, not very readily attacked by whiteants. Used for the posts of houses, for the handles of ploughs, for harrows, carpenter's tools, and spinning wheels.
(22) Kuchila	Strychnos nux vomica	Wood hard and durable. Used for the handles of ploughs.
(23) Kuruma	Nauclea cordifolia	Wood of a yellowish colour. Used for the doors of houses and for making cheap furniture. Very light, a cubic foot weighing about 44 lbs.
(24) Kusuma	Schleichera trijuga	Wood very hard and used for making axles, ploughs, sugarcane crushers, oil-mills and *dhenkis*. A cubic foot weighs about 78 lbs. An oil expressed from the nut is used for burning. Lac is reared on its branches.
(25) Mahul	Bassia latifolia	Used sometimes for door and window frames and panels.
(26) Makar kendu.	Diospyros embryopteris	The centre wood is black (ebony), but it is not very valuable, as the trees are not large.
(27) Mitkinia	Kydia calycina	Wood hard and of a brownish colour. Used for cart wheels and cheap furniture.
(28) Moi	Odinia wodier	Wood reddish brown when ripe. Valued for cattle yokes, oil-mills, *dhenkis*, wheel-spokes and house posts. The weight of a cubic foot is about 38 lbs.
(29) Naria	Cocos nucifera	Wood used for water-lifts.
(30) Nima	Melia azadirachta	Wood brown, hard and heavy. Used in the buildings of huts, for making the handles of ploughs and for boxes. It is said to be proof to whiteants.
(31) Panus	Artocarpus integrifolia	The wood comes near to mahogany in appearance, and is largely used for carpentry, boxes, furniture, oil-mills, and palkis. The weight of a cubic foot varies from 40 to 45 lbs.
(32) Patuli	Stereospermum suaveolens.	Wood of a yellowish colour. Used for posts.
(33) Piasal	Pterocarpus marsupium	Wood much used for doors and window frames, for posts, beams, furniture, agricultural implements, carts and boats. The heart wood is brown with dark streaks, while the wood itself is yellowish gray. Weight of a cubic foot is about 55 lbs.
(34) Rai	Dillenia pentagyna	Wood of a brownish colour. Used for posts.

Urya name.	*Botanical name.*	*Description and remarks.*
(35) Salua	Shorea robusta	Wood very strong and durable. Used for posts, beams, rafters, door frames, ploughs, boats, &c. Weight of a cubic foot varies from 56 to 60 lbs.
(36) Simli	Bombax malabaricum	Wood light and soft. Used for planking and for dug-outs. The weight of a cubic foot varies from 20 to 30 lbs.
(37) Sissu	Dalbergia latifolia	Wood very dark red or blackish, very hard and durable. Used for furniture, for posts of houses, for the panels and frames of doors, for the canopied palkis used in religious festivals and ceremonies. A cubic foot weighs from 52 to 55 lbs.
(38) Sissu	Dalbergia sissoo	Wood dark red and tough and, like the above, highly esteemed for furniture.
(39) Sonari	Cassia fistula	Wood hard and heavy. Used in building huts.
(40) Tala	Borassus flabelliformis	Wood used for rafters and for water-lifts.

SECTION 2.

UNCULTIVATED PLANTS YIELDING FOOD.

In the list given below will be found the names of some plants which are cultivated for their fruit. They are included here as they are also found growing out of gardens :—

Urya name.	*Botanical name.*	*Remarks.*
(1) Amba	Mangifera indica	The fruit is eaten green and ripe, and the seed is also eaten in times of distress.
(2) Amra	Spondias mangifera	The fruit is eaten raw and cooked.
(3) Amritabhanda.	Carica papaya	The green fruit is cooked and eaten as a vegetable in curries. The ripe fruit is also largely eaten.
(4) Aonla	Phyllanthus emblica	The fruit full of a sharp juice is eaten raw and ripe, cooked and pickled.
(5) Ashata	Ficus religiosa	The leaves, buds and fruit are eaten in times of distress.
(6) Badam	Terminalia catappa	The kernels are very palatable, and are considered wholesome and nutritive.
(7) Bahara	Terminalia belerica	The kernels of the fruit are eaten. They are reckoned intoxicating when eaten in any quantity.
(8) Baincha	Flacourtia cataphracta	The berries are palatable and reckoned wholesome.
(9) Bar	Ficus indica	The fruit is eaten in times of distress.
(10) Barakuli	Zizyphus jujuba	The fruit is eaten raw and cooked.
(11) Bela	Aœgle marmelos	The ripe fruit is esteemed wholesome.
(12) Bhalia	Semecarpus anacardium	The fleshy receptacle on which the seed rests is roasted and eaten.
(13) Bhendia mardan.	Sterculia urens	The seeds are roasted and used as an article of diet.
(14) Bhue khajuri	Phœnix acaulis	The interior of the stem is eaten in famine times.
(15) Bodabodoria	Olax scandens	The ripe drupe is eaten.
(16) Bohol	Mimusops elengi	The fruit is sometimes eaten.
(17) Chakunda	Casia tora	The leaves are eaten in times of famine.
(18) Chara	Buchanania latifolia	The kernels are eaten, being a very good substitute for almonds.
(19) Cholia	Psidium pomiferum	The fruit is much liked by the people.
(20) Dhea phul	Artocarpus lakoocha	The fruit is edible. The male spadix, which is acid and astringent, is eaten in curries.
(21) Dholanku	Alangium lamarckii	The fruit is eaten when ripe.
(22) Dimri	Ficus cunia	The fruit is edible.
(23) Domri	Ficus glomerata	The fruit is eaten green in curry and also when ripe.
(24) Jamu	Eugenia jambolana	The fruit is eaten ripe.
(25) Kadamba	Anthocephalus cadomba	The fruit is eaten in times of distress.
(26) Kanchan	Bauhinia variegata	The fruit is edible.
(27) Kantamaris	Amaranthus spinosus	The leaves of this thorny weed are eaten as *sag*.
(28) Kathbel	Feronia elephantum	The fruit is edible and much esteemed by many.
(29) Kendu	Diospyros melanoxylon	The ripe fruit is eaten. It has an astringent taste and is not very palatable.

Urya name.	*Botanical name.*	*Remarks.*
(30) Kerendakuli	Carissa carandas	The fruit is eaten raw, cooked and pickled.
(31) Khajuri	Phœnix sylvestris	The fruit is eaten ripe.
(32) Kia	Pandanus odoratissimus	The lower pulpy parts of the drupes are edible.
(33) Kontaikuli	*Zizyphus napica*	The ripe fruit is eaten.
(34) Kusuma	Schleichera trijuga	The fruit is eaten. The pulpy sub-acid aril is very palatable.
(35) Mahul	Bassia latifolia	The flowers are eaten. They have a sweet spirituous taste. The fruit, called *tula*, is also taken raw and cooked. The seed yields an oil which is used in the kitchen mixed with *ghi*.
(36) Makar kendu	Diospyros embryopteris	The tender leaves are used as a vegetable and the ripe fruit is edible. Both have an astringent taste.
(37) Manda gila	Cœsalpinia bonducella	The leaves are eaten cooked.
(38) Mosonea	Ehretia lœvis	The inner bark is eaten in times of famine.
(39) Newa	Annona reticulata	The fruit is eaten when ripe.
(40) Nima	Melia azadirachta	The leaves are always considered wholesome as a curry. The ripe fruit is eaten by the lowest classes in times of famine.
(41) Pijuri	Psidium pyriferum	The fruit is eaten.
(42) Salpo	Caryota urens	The pith of the trunk of old trees yields a farinaceous food, which can be made into bread or boiled into a thick gruel-like sago.
(43) Salua	Shorea robusta	The fruit, called *sarnigo*, is eaten by the people in times of distress.
(44) Siali noi	Bauhinia vahlii	The seeds are eaten roasted.
(45) Tentuli	Tamarindus indica	The fruit is eaten raw and in curries.

Besides the above, the *following wild roots, greens, &c.*, are eaten:—

(*a*)	(1) Baghra ole	The roots are eaten after cutting into slices, boiling, placing in water for two days and then drying, when they are ready to be converted into flour.
	(2) Bali-alu	The tuber is boiled, roasted, or made into flour.
	(3) Bamanjhati	The leaves and young stems of this shrub (*Siphonanthus indica*) are boiled.
	(4) Bansaru	The root of this arum makes a good curry, and is also eaten boiled.
	(5) Gurgur	The grain of gurgur (*Coix locryma*) serves as food when available.
	(6) Kanta alu	The tuber is boiled.
	(7) Kanta-karai	The tuber is eaten boiled.
	(8) Karba alu	The tuber is boiled or made into a curry.
	(9) Kasa alu	The tuber is prepared in the same way as *Pita alu*.
	(10) Kodus	The grain is used as food.
	(11) Kooe kandamul	This is a waterlily, usually known as *shaluk* (*Nymphœa lotus*). The root is esteemed in curries.
	(12) Motka	Both the fruit and root are eaten. The unripe fruit of this creeper (*Trichosanthes cucumerina*) is generally stewed. It is exceedingly bitter, for which it is reckoned the more wholesome.
	(13) Pita alu	The tuber is cut in slices and boiled. It is then placed in water for a day, after which it is boiled again.
	(14. Surkuti	The root is eaten boiled. This plant (*Rottlera tinctoria*) also yields a red dye.
	(15) Takua-noi	The juice of the stems supplies a drink when water is not available.
	(16) Torania-mula	The tuber is eaten uncooked, especially by children.
(*b*)	(1) Agabathua	These are all shrubs, and are eaten as *sag* in curries.
	(2) Ban sarisa	
	(3) Barda	
	(4) Chauldhua	
	(5) Dadaya	
	(6) Goicho	
	(7) Kainjari	
	(8) Kanasiri	
	(9) Madranga	
	(10) Majukchulia	
	(11) Nabanga	
	(12) Puruni	

(*c*)	(1) Hirimchi ...		These are aquatic weeds eaten as *sag*.
	(2) Kalama ...		
	(3) Kulni ...		
	(4) Sunsunia ...		
(*d*)	(1) Bana ...		These are creepers which are eaten as *sag*.
	(2) Bhadabhadria ...		
	(3) Gakhura ...		
	(4) Gurukhia ...		
	(5) Machimachia ...		
	(6) Nuden ...		
	(7) Panjia ...		
	(8) Phandi ...		
	(9) Pitaguma ...		

SECTION 3.

CULTIVATED FRUIT TREES.

Banki and Dompara in the south-west corner of Cuttack have enormous mango groves, which are to be found scattered over other parts of the district too. Though the laterite soil of Cuttack seems to be well suited to the development of these trees which attain a very large size, the fruit as a rule is of very inferior quality. Though sweet and luscious mangoes may be found in Cuttack with a fragrant smell and without any fibre, the majority, as far as I have seen, are really large berries consisting of stone and string, and with the characteristic turpentine smell common to inferior mangoes.

Jak trees have a similar defect, in that the fruit they bear are generally of the common stringy variety.

Tamarind trees flourish extensively in many jungle tracts, replacing the mango on undulating land.

Plantains are cultivated in small patches all over the district, but, with the exception of the variety which is used as a vegetable, the fruit is generally very coarse. Good plantains, however, are reared by gardeners on suitable soil.

Papayas are rather common, but are not generally appreciated by the Uryas, who have an idea that it induces elephantiasis and similar diseases. Some specimens of this fruit I have met with in Cuttack are not much smaller than a moderate sized pumpkin.

Cocoanuts cannot be said to be cultivated to any very great extent. When found in isolated villages, they are generally without fruit. Under the tending of Brahmans, however, many trees are found to flourish well, especially in the tracts in the south-east near the sea coast. Of cocoanut plantations, the most famous one in the district is that at False Point belonging to the Burdwan Raj Kujang estate. It seems that there were originally some 16,000 trees in the plantation, of which 4,000 were destroyed by the cyclones of 1885 and 1888. The Sub-Manager in a letter to the Collector after these cyclones stated that the plantation covered about 110 *máns* of land, in which were standing about 12,000 cocoanut trees, but Mr. Reily's report fixes the number at 30,000 A portion of the plantation is being reclaimed to ascertain whether such reclamation is likely to add to the income of the estate.

Betelnut trees are also very few. An attempt has been made by the Agricultural Department to introduce the growth of these trees in the Kujang estate.

The date-palm (*Phœnix acaulis*) and the palmyra fan palm (*Borassus flabelliformis*) are scattered over the district. No use is made of the juice of the former to manufacture *gur*, as the trees are tapped by Chamars, who are regarded as unclean and loathsome by the fastidious higher castes. Toddy, however, is sold to a large extent among the lower classes.

The following list gives the names of the fruit trees cultivated in the district :—

Urya name.	*Common name.*	*Botanical name.*
(1) Amba ...	Mango ...	Mangifera indica.
(2) Amra ...	Hog plum ...	Spondias mangifera.
(3) Amrita bhanda ...	Papaya ...	Carica papaya.
(4) Ata ...	Custard apple ...	Annona squamosa.

Urya name.		*Common name.*		*Botanical name.*
(5) Badam	...	Almond	...	Terminalia catappa.
(6) Bara kuli	...	Round plum	...	Zizyphus jujuba.
(7) Batabi	...	Pomelow	...	Citrus decumana.
(8) Bela	...	Bel	...	Ægle marmelos.
(9) Cholia	...	Round guava	...	Psidium pomiferum.
(10) Dalimba	...	Pomegranate	...	Punica granatum.
(11) Golabjamu	...	Rose apple	...	Eugenia jambos.
(12) Gua	...	Betelnut	...	Areca catechu.
(13) Jamu	...	Blackberry	...	Eugenia jambolana.
(14) Kadoli	...	Plantain	...	Musa paradiasica.
(15) Kamla	...	Orange	...	Citrus aurantium.
(16) Karmanga	...	Kamarunga	...	Averrhoa carambola.
(17) Kathbela	...	Kathbel	...	Feronia elephantum.
(18) Khajuri	...	Date palm	...	Phœnix sylvestris.
(19) Lanka amba	...	Cashew nut	...	Anacardium occidentale.
(20) Lembu—	Pati Kagji Gora Taba	Lemon	...	Citrus limonum.
(21) Litchu	...	Litchi	.	Nephelium litchi.
(22) Mewa	...	Bullock's heart	...	Annona reticulata.
(23) Naria	...	Cocoanut	...	Cocos nucifera.
(24) Oao	...	Chalta	...	Dillenia indica.
(25) Panus	...	Jak	...	Artocarpus integrifolia.
(26) Phalsa	...	Phulsa	...	Grewia asiatica.
(27) Pijuri	...	Guava	...	Psidium pyriferum.
(28) Sapri	...	Pine apple	...	Bromelia ananas.
(29) Sujna	...	Sajne	...	Moringa pteryjosperma.
(30) Tala	...	Palmyra palm	...	Borassus flabelliformis.
(31) Tentuli	...	Tamarind	...	Tamarindus indicus.
(32) Tutkali	...	Mulberry	...	Morus indicus.

SECTION 4.

TREES AND PLANTS YIELDING MEDICINAL DRUGS.

The following list contains the names of the trees and plants which yield drugs that are used by the native physicians of Cuttack. Descriptions of the medicinal properties are given in each case, being taken from Dr. Watt's account of the vegetable products of India in his Catalogue of Exhibits at the Indo-Colonial Exhibition of 1886, from Mr. T. N. Mukharji's descriptive Catalogue of Indian produce contributed to the Amsterdam Exhibition in 1883, and also obtained to some extent by personal enquiry among the *baidyas* (physicians) of the district:—

(1) *Ada*	...	(*Zingiber officinale*).—The root is prescribed in bronchial and pulmonary affections, rheumatism and dropsy. The juice of fresh ginger is laxative.
(2) *Ayuyabathu*	...	(*Premna spinosa*).—The leaves, roots, and bark are pounded together and made into a decoction which is found useful in fever and gout. The root is bitter and stomachic, and is given in decoction as a cordial and tonic. It forms an ingredient of *dasamula*, a native preparation of ten roots. The leaves are bitter and carminative, and rubbed along with pepper are administered in colds and fevers.
(3) *Akunda* or *arkha*	...	(*Calatropis gigantea*).—The root, bark, and juice of this plant are used in medicine for their emetic, diaphoretic, alterative, and purgative properties. In the treatment of dysentery, the dried bark of the root is said to be an excellent substitute for ipecacuanha The bark, root, and dried milky sap may be used in small doses in certain cutaneous affections, such as leprosy and secondary syphilis; the root bark in large doses acts as an emetic. A preparation from it is administered to promote secretions, and is stated to be useful in enlargements of the abdominal viscera, intestinal worms, cough, ascites, anasarca, &c. The flowers are considered digestive, stomachic, tonic, useful in asthma, catarrh, and loss of appetite.

(4)	*Aluo*	... (*Amorphophallus campanulatus*).—The raw wild tuber and the seeds are irritant, and are applied externally to rheumatic swellings and boils.
(5)	*Amada*	... (*Curcuma amada*).—The fresh rhizome is regarded as cooling and useful in prurigo.
(6)	*Amba*	... (*Mangifera indica*).—The ripe fruit is laxative. The bark is used as an astringent, valuable in hæmorrhages, diarrhœa, and other discharges. The decoction of the kernel, either alone or in combination with *bel* and ginger, is generally prescribed in diarrhœa. The juice of the kernel, as a snuff, is employed to stop nasal bleeding. The kernel is also described in the Indian Pharmacopœia as an anthelmintic, and containing a large quantity of gallic acid, is said to be highly useful in bleeding piles and menorrhagia. The unripe fruit has the reputation of being useful in ophthalmia, and the seeds in asthma.
(7)	*Amra*	... (*Spondias mangifera*).—The bark is used in dysentery.
(8)	*Amritabhanda*	... (*Carica papaya*).—A milky juice exudes from the green fruit, which is considered a good medicine for ague and enlarged spleen. The green fruit is prescribed in piles.
(9)	*Anguti*	... (*Clerodendron infortunatum*).—The whole plant is extremely bitter, and the leaves are considered an efficient anthelmintic.
(10)	*Ankranti*	... (*Solanum jacquini*).—The different parts of the plant are used as expectorants in cough.
(11)	*Aonla*	... (*Phyllanthus emblica*).—The fruit constitutes the emblic myrabolam. It is purgative when fresh, but when dry is used as an astringent in bowel-complaints and hæmorrhages. It is useful in diarrhœa and dysentery, and is regarded as an antiscorbutic. It contains a large proportion of gallic acid. The flowers are employed as a refrigerant and aperient. The bark is astringent. An extract from the root is used medicinally. The fresh juice is cooling, refrigerent, diuretic, and laxative. The exudation from the incisions on the fruit is used as an external application in inflammation of the eye.
(12)	*Arithu*	... (*Oxallis pusilla*).—The juice of the leaves is used in eye diseases.
(13)	*Arjuna*	... (*Terminalia arjuna*).—The bark is astringent and febrifuge; the fruit tonic and deobstruent; the juice of the fresh leaves is a remedy for earache. The bark is also used in heart-diseases, contusions, ulcers, ringworms, &c.
(14)	*Asan*	... (*Terminalia tomentosa*).—Parts of this plant are said to be good stimulants.
(15)	*Asoka*	... (*Jonesia asoca*).—The leaves and bark are used as astringents. The bark is very useful in cases of internal hæmorrhoids and also in menorrhagia.
(16)	*Ashata*	... (*Ficus religiosa*).—The bark is astringent and is used in special diseases. It is also very useful for promoting suppuration of abscesses and boils. The fruit is laxative, helps digestion, and is a remedy for asthma.
(17)	*Aswagandha*	... (*Physalis somnifera*).—The leaves are bitter and narcotic, given in fever and special diseases. The long white root which smells like a horse—hence the name *aswagandha* (horse-smelling)—is considered diuretic and deobstruent, and also a sedative; useful in special diseases. The root and the leaves made into pulp are used as an external application to boils and swellings.
(18)	*Ata*	... (*Anona squamosa*).—The ripe fruit is considered a maturant, and bruised and mixed with salt, it is applied to malignant tumours to hasten suppuration. An infusion of the leaves is considered efficacious in *prolapsus ani* of children. The root is considered a drastic purgative.
(19)	*Bahara*	... (*Terminalia belerica*).—The fruit is an astringent tonic in small doses, in large doses purgative; considered useful in dropsy, piles, diarrhœa, and leprosy. The kernel of the fruit is said to act as a narcotic poison, and produces intoxication if taken in a large dose.
(20)	*Baibiranga*	... (*Embelia ribes*).—The berries are regarded as pungent, healing, and stimulant, and are also said to act as a good vermifuge.

(21) *Baigaba* ... (*Jatropha curcas*).—The seed yields an oil which is used as a purgative and emetic, and also as an application in cutaneous diseases. In overdoses it acts as an acro-narcotic poison. The diluted oil forms an useful embrocation in chronic rheumatism.

(22) *Baira* ... (*Terminalia moluccana*).—The fruit is used as a febrifuge and vermifuge.

(23) *Bajra mula* ... (*Penicillaria spicata*).—The root is used in gonorrhœa.

(24) *Bakuchi* ... (*Psoralia corylifolia*).—The seeds are aromatic and bitter, and might be used as tonic or alterative. They are also useful in skin diseases. Dr. Kanaye Lal De states that the extract from the seeds is a specific for white leprosy.

(25) *Bakusa* ... (*Adhatoda vasica*).—The leaves, bark and root are considered very efficacious in colds and coughs.

(26) *Bamanjhati* ... (*Siphonanthus indica*).—The root and leaves are used in asthma and fevers.

(27) *Banhaldi* ... (*Curcuma aromatica*).—The rhizome is said to possess tonic and carminative properties, and is useful in skin diseases and disorders of the blood.

(28) *Bankurthi* ... ( ).—The flowers are used for gout.

(29) *Barakuli* .. (*Zizyphus jujuba*).—The fruit is considered a blood-purifying agent. The bark contains much tannic acid and is given in diarrhœa. The root is used in decoction in fever and applied externally to ulcers. The leaves are made into plaster for strangury and other diseases.

(30) *Barnua* ... (*Cratæva religiosa*).—The bark is used as a tonic and febrifuge. The juice is good for gout.

(31) *Basang* ... (*Bergera königii*).—The bark and root are used as stimulants. Externally they are also used to cure eruptions and the bites of poisonous animals. The green leaves are taken for the cure of dysentery; they are also bruised and applied externally to cure eruptions. The different parts of the plant are also used in cough.

(32) *Bata* ... ( ).—The bark and leaves are used in cough.

(33) *Begunia* ... (*Vitex negundo*).—The root is tonic, febrifuge, and expectorant. The leaves are aromatic, tonic, and vermifuge, and given in decoction, with the addition of long pepper, in catarrhal fever with heaviness of head and dulness of hearing. A pillow stuffed with the leaves is placed under the head to relieve headache. The juice of the leaves is applied to ulcers. An oil prepared with the juice of the leaves is applied to sinuses and scrofulous sores. Dr. Fleming remarks that the leaves are discutient and useful in dispersing swellings of the joints from acute rheumatism and of the testes from suppressed gonorrhœa. This dried fruit acts as a vermifuge.

(34) *Bela* ... (*Ægle marmelos*).—The unripe fruit is cut up and sun-dried, and in this form is sold in the bazars in dried whole or broken slices. It is regarded as astringent, digestive, and stomachic, and is prescribed in diarrhœa and dysentery, often proving effectual in chronic cases after all other medicines have failed. It seems especially useful in chronic diarrhœa; a simple change of the hours of meals and an alteration in the ordinary diet, combined with *bel* fruit, will almost universally succeed.

The ripe fruit is sweet, aromatic, and cooling, and made into a morning *sherbet* cooled with ice is pleasantly laxative and a good simple cure for dyspepsia. The dried ripe pulp is astringent and used in dysentery.

The root bark is sometimes made into a decoction and used in the cure of intermittent fever. It constitutes an ingredient in the *dasamul* or preparation from ten roots.

The leaves are made into poultice used in the treatment of ophthalmia, and the fresh juice diluted is used in catarrhs and feverishness.

(35) *Bena* ... (*Andropogon muricatus*).—The infusion of the roots is held to be stimulant, diaphoretic, stomachic, and refrigerant.

(36) *Bhalia*	(*Semecarpus anacardium*).—The acrid juice of the marking-nut is a powerful vesicant and is applied externally to cold swellings. The ripe fruit is regarded as acrid, heating, stimulant, digestive, nervine, and escharotic, and is used in dyspepsia, piles, skin diseases, nervous debility, &c. In Goa, the nut is used internally in asthma after having been steeped in butter-milk, and is also given as a vermifuge.
(37) *Bhringaraj*	(*Verbesina scandens*).—This is used externally in headache and ophthalmia.
(38) *Bhuiamla*	(*Phyllanthus niruri*).—The root tastes bitter and astringent. The Rev. Dr. John states that the fresh root proves an excellent remedy for jaundice.
(39) *Bhuikusmunda*	(*Trichosanthes cordata*).—The root is used in gout and headaches.
(40) *Bhutairi*	( ).—This is a tonic and febrifuge. The root is used in headaches.
(41) *Bichuti*	(*Tragia involucrata*).—The root is used as an alterative in special diseases, and proves a good remedy also for fever, gout, and cough.
(42) *Bohol*	(*Mimusops elengi*).—The bark is an astringent tonic, and in decoction forms a good gargle to promote salivation. Water distilled from the flowers is used as a stimulant medicine, and also as a perfume. The unripe fruit is astringent, and when chewed affords firmness to the teeth. The dried and powdered flowers are snuffed by persons labouring under the disease known in Bengal as *ahwa*, which is generally accompanied by headache, strong fever, and pain in the neck. It relieves the pain in the head by inducing copious discharges from the nose. The bruised seeds are applied locally within the anus in cases of constipation of children.
(43) *Boromali*	(*Hiptage madublata*).—This is prescribed in cough.
(44) *But*	(*Cicer aristinum*).—Medicinally it is considered anti-bilious.
(45) *Chakunda*	(*Cassia tora*).—The leaves are used as an aperient; both leaves and seeds constitute a valuable remedy in skin diseases, chiefly ringworm and itch. The root rubbed to a pulp with lime-juice has almost specific powers in the case of ringworm.
(46) *Champa*	(*Michelia champaca*).—The bark is bitter and aromatic, useful in intermittent fevers and in promoting menses. The seeds and fruit are used for healing cracks in the feet. The roots act as a purgative.
(47) *Chatauri.*	(*Asparagus racemosus*).—The root is considered refrigerant, demulcent, diuretic, aphrodisiac, antispasmodic, and alterative. It is employed chiefly in nervous and renal diseases. When administered in combination with sugar and honey, it is effectual in diarrhœa and dysentery caused by bilious disorders.
(48) *Chemudanimul*	(*Hemidesmus indicus*).—The root of the plant is used as a substitute for sarsaparilla. It possesses diuretic, diaphoretic, and alterative properties.
(49) *Chhatiana*	(*Astonia scholaris*).—The bark is bitter, and is a powerful tonic, efficacious in bowel-complaints, and useful as a febrifuge.
(50) *Chitamul-nil*	(*Plumbago seylanica*).—The root is used in medicine as a powerful irritant. It is ground, made into a paste by mixing with flour and applied as a blister on pains. Taken internally, it is employed to cure skin diseases and to promote digestion. It is employed to cause abortion by applying it locally to the uterus, and is also taken internally. Dr. Bidie states its application frequently induces fatal uterine inflammation. It is considered a remedy for secondary syphilis and leprosy, but great caution is necessary in its use.
(51) *Chitamul-lal*	(*Plumbago rosea*).—In medicinal properties, this shrub is hardly to be distinguished from *chitamul-nil*. The root is a well-known vesicant.
(52) *Datura*	(*Datura fastuosa*).—The seeds are given as a narcotic anodyne in asthma and bronchitis. Leaves are smoked to obtain relief in spasmodic asthma. It is with the seeds of this plant mixed with sweetmeats that travellers are stupefied and robbed.

(53) *Dalimba*	(*Punica granatum*).—The fresh juice of the fruit is an ingredient of cooling and refrigerant mixtures for dyspepsia. The rind of the fruit is used as an astringent in diarrhœa. The seed is stomachic, the pulp cardiac and stomachic. Pomegranate peel, with opium and an aromatic, such as cloves, is an efficacious remedy in chronic dysentery and diarrhœa. A decoction of the bark followed by a purgative acts as an anthelmintic. The efficiency of the decoction of the root bark as a remedy for tape worm is now well established in India.
(54) *Danti*	(*Croton tiglium*).—The seed is used as a powerful drastic purgative. In over-doses, it acts as an acro-narcotic poison. The croton oil expressed from the seed possesses powerful hydragogne cathartic properties. It acts externally as a rubefacient and counter-irritant. It is useful in dropsy, obstinate constipation, and apoplexy.
(55) *Daruhalda*	( ).—This is used in palpitation of the heart, in ophthalmia, rheumatism and indigestion.
(56) *Dhana*	(*Oryza sativa*).—The grain when husked, *i.e.*, common rice, is used for poultices. Some preparations of it also form a sick diet.
(57) *Dubaghas*	(*Cynodon dactylon*).—The juice of the green grass is considered a good remedy for dysentery.
(58) *Dudhi lata*	(*Oxystelma esculentum*).—A decoction of the plant is used in ulcerations of the mouth and the fresh roots in jaundice.
(59) *Gajapipal*	(*Scindapsus officinalis*).—The fruit is used as a stimulant, anthelmintic and diaphoretic.
(60) *Gakhura*	(*Tribulus lanuginosus*).—A decoction of the plant acts as a tonic, anodyne and febrifuge
(61) *Galancha*	(*Tinospora cordifolia*).—The stems, leaves, roots and watery extract are all used in medicine. The entire plant is regarded as a valuable alterative and tonic, and useful in general debility, fever, jaundice, skin diseases, rheumatism, urinary diseases, irritability of stomach and syphilitic affections. It is regarded also as a specific for insanity.
(62) *Gambhari*	(*Gmelina arborea*).—Some parts of the plant are said to be useful in cases of fever.
(63) *Ganga sheoli*	(*Nyctanthes arbor- tristis*).—The bark is used as an astringent medicine; the leaves are considered febrifuge; the flowers are used in ringworm and to reunite broken bones, and also in disorders of mucous or bile.
(64) *Ghi kumuri*	(*Aloe vera*).—The juice is an aperient, and deemed highly beneficial to persons predisposed to apoplexy. It is used in fevers, spleen and liver complaints, and as an external application in certain eye diseases. The pulp of the leaves is applied to boils, and is regarded as acting powerfully on the uterus.
(65) *Ghorbacha*	(*Acorus calamus*).—The rhizomes contain an aromatic bitter principle, and are considered useful in fever, cough, colic and dyspepsia.
(66) *Gila*	(*Cæsalpinia sepiaria*).—This serves as an useful astringent medicine.
(67) *Gua*	(*Areca catechu*).—Young unhusked nuts possess astringent properties, and are prescribed in bowel-complaints and bad ulcers.
(68) *Gulbas* (*Latkan*)	(*Bixa orellana*).—It is reckoned an astringent and slightly purgative, and is considered a good remedy for dysentery and diseases of the kidneys.
(69) *Gundi*	(*Mallotus phillippinensis*).—This is used in medicine as a purgative and anthelmintic.
(70) *Harbhanga*	(*Cissus quadrangularis*).—The root especially, and the entire plant are used for gout, and for dislocation and in joining fractures.
(71) *Harida*	(*Terminalia chebula*).—The fruit (myrabolam) is used as a powerful astringent in ophthalmia and to purify blood. In large doses, it acts as purgative. An infusion of the fruits of *terminalia chebula*, *terminalia belerica*, and *phyllanthus emblica* is used for regulating the action of the liver. Chebulic myrabolams are also used in fever, cough, asthma, urinary diseases, piles, intestinal worms, chronic diarrhœa, costiveness, flatulence, vomiting, hiccough, heart diseases, enlarged spleen and liver, ascites, skin diseases, &c.

(72) *Harwari*	(*Woodfordia floribunda*).—The dried flowers are prescribed as an astringent tonic in the disorders of the mucous membranes, hæmorrhoids, and in derangements of the liver; and are also considered a safe stimulant in pregnancy.
(73) *Hastikarna*	(*Clerodendron infortunatum*).—The whole plant is extremely bitter, and is considered an useful tonic.
(74) *Hatiankusa*	(*Pisonia aculeata*).—The bark and the leaves are used as an irritant for application on swelling of the limbs and rheumatic pains.
(75) *Hatisura*	(*Tiaridium indicum*).—This is considered a good remedy for earache.
(76) *Hintal*	(*Phœnix paludosa*).—The juice, barks and roots have a cooling effect on the system, and are used medicinally to relieve irritable burning sensations.
(77) *Indravaruni*	(*Citrullus colocynthis*).—This is considered a safe purgative. The pulp of the fruit is used in biliousness, constipation and fever, and is said to possess bitter, acid, and cathartic properties. The root is also used as a cathartic medicine in various diseases.
(78) *Isabgul*	(*Plantago ispaghula*).—The seeds are emollient, demulcent, and diuretic, largely prescribed in dysentery and piles.
(79) *Jadumari*	(*Cassia alata*).—The fresh leaves, bruised and mixed with lime juice, are a specific for ringworm. They are also used in other cutaneous affections, and are supposed to be efficacious in poisonous bites. Internally the leaves and flowers are prescribed as a tonic.
(80) *Jainti*	(*Sesbania ægyptica*).—The leaves are applied as a cataplasm to promote suppuration or absorption of boils and abscesses. The seeds mixed with flour are applied externally to itching of the skin, and are supposed to possess stimulant emmenagogue properties.
(81) *Jaitimul*	(*Æschynomene sesban*).—The root is an antispasmodic. The leaves are used as a poultice in orchitis.
(82) *Jamu*	(*Eugenia jambolana*).—The bark is astringent and used in cases of dysentery, and the decoction as a tooth gargle. The fresh juice of the bark is given with goat's milk in the diarrhœa of children. A vinegar prepared from the juice of the unripe fruit is an agreeable stomachic, and carminative; it is also used as a diuretic. The expressed juice of the leaves is employed alone or in combination with other astringents in dysentery.
(83) *Jara*	(*Ricinus communis*).—The oil prepared from the seeds of this plant is a mild and efficacious purgative, useful in costiveness, tympanitis, fever, inflammation, &c. It is much valued in chronic rheumatic diseases. The root is useful in various forms of rheumatism, such as lumbago, pleurodynia, and sciatica, &c. The root-bark is used as a purgative and alterative in chronic enlargements and skin diseases. The fresh juice of the leaves is used as an emetic in poisoning by opium and other narcotics, and a decoction or poultice may be used as a lactagogue.
(84) *Kadali*	(*Musa paradiasica*).—The flower is considered cool and astringent, very useful in diabetes.
(85) *Kaladana*	(*Pharbitis nil*).—The seeds are used in medicine and reckoned a safe and effectual cathartic, administered in constipation, dropsy, intestinal worms, and diseases of the brain.
(86) *Kalara*	(*Momordica charantia*).—The fruit is bitterish in taste, acts as an anthelmintic, stomachic, and a cool laxative, useful in piles, jaundice, and special diseases. The juice of the fresh leaves is given to children as a mild purgative.
(87) *Kalkasundi*	(*Cassia occidentalis*).—The leaves and seeds are used externally in cutaneous diseases.
(88) *Kanchan*	(*Bauhinia variegata*).—The bark is alterative, tonic, astringent and useful in scrofula, skin diseases and ulcers.
(89) *Kankua*	(*Alpinia*).—The bark is an astringent and the root a vermifuge.
(90) *Kanta kusuma*	(*Argemone mexicana*).—The whole plant abounds in a yellow juice which is prescribed in dropsy, jaundice, and cutaneous affections. An oil is obtained from the seeds which is given medicinally in ulcers and eruptions.

(91)	*Kantapalas*	(*Cochlospermum gossypium*).—The tree yields the gum *katira*, used as a demulcent in coughs and special diseases.
(92)	*Karang*	(*Pongamia glabra*).—The seed yields a thick oil which is used as an application for cutaneous affections and rheumatism. The seeds are also used as a remedy for skin diseases.
(93)	*Karmanga*	(*Averrhoa carambola*).—The leaves, the root, and the fruit are used as a cooling medicine for fever and other diseases.
(94)	*Kasundi*	(*Cassia sophera*).—The bark, leaves, and seeds are used as a cathartic, and as a remedy for ringworm.
(95)	*Kataka*	(*Strychnos potatorum*).—The seed is chiefly used as a local application in eye diseases. Rubbed with honey and a little camphor, it is applied to the eyes in lachrymation. Rubbed with water and rock salt, it is applied for chemosis in the conjunctiva. It is also used as an emetic, and as a remedy in diabetes and gonorrhœa.
(96)	*Kathbela*	(*Feronia elephantum*).—The gum is used medicinally as a demulcent. The unripe fruit is astringent, prescribed in dysentery and diarrhœa.
(97)	*Kendu*	(*Diospyros melanoxylon*).—The bark is astringent, and is used as a tonic in diarrhœa and dyspepsia.
(98)	*Khair*	(*Acacia catechu*).—The extract made from it is a valuable astringent in diarrhœa, dysentery, and mucous discharges.
(99)	*Khajuri*	(*Phœnix sylvestris*).—The kernels of the fruit are used in medicine to relieve thirst.
(100)	*Khetpapra*	(*Odlenlandia biflora*).—A decoction made of it is considered a valuable remedy for low fevers.
(101)	*Kia*	(*Pandanus odoratissimus*).—The flowers are used for earache and gout.
(102)	*Kincha*	(*Abrus precatorius*).—The root is said to possess some of the properties of liquorice. The leaves mixed with honey are applied to swellings. The whole plant is demulcent.
(103)	*Kuchila*	(*Strychnos nux vomica*).—The nux vomica seed is used in dyspepsia and diseases of the nervous system. It is very useful in palsy, relaxation of the muscles and tendons, debility, and chronic rheumatism. It has been recommended in neuralgic affections, atonic diarrhœa, and chronic dysentery, also in habitual constipation, prolapsus of the rectum, spermatorrhœa, &c.; it has also been employed in intermittent fevers, epilepsy, diabetes, anæmia, chlorosis, and other affections.
(104)	*Kumbi*	(*Careya arborea*).—The bark is astringent, and the flowers are given as a tonic after childbirth.
(105)	*Kurhoi*	(*Wrightea anti-dysenterica*).—The bark is a very valuable remedy for dysentery.
(106)	*Ladhu*	(*Symplocos racemosa*).—This is reckoned cooling and astringent, and is prescribed in bowel-complaints, diseases of the eye, bad ulcers, &c.
(107)	*Lajkur*	(*Mimosa pudica*).—The leaves and roots are used in gout.
(108)	*Lanka-amba*	(*Anacardium occidentale*).—The oil of the nut is used as an anæsthetic in leprosy with advantage. In warts, corns, and ulcers it is also held beneficial. The expressed juice of the fruit is given in diarrhœa and diabetes.
(109)	*Lanka Siju*	(*Euphorbia tirucalli*).—The juice or milk is used as a detergent healing or in swellings.
(110)	*Lasuna*	(*Allium sativum*).—This is given in fevers, coughs, piles, leprosy, and special diseases. Externally its juice is applied to the ears for deafness and pain.
(111)	*Lembu*	(*Citrus limonum*).—The fruits of the *pati* and *kagji lembu* are given in dyspepsia. The root is considered stomachic.
(112)	*Mahanima*	(*Melia azedarach*).—The bark is extremely bitter, and is employed as an anthelmintic in the form of decoction. In large doses it exercises narcotic influence on the constitution. The fresh berries and leaves are supposed to be poisonous. The flowers and leaves are applied as a poultice to relieve nervous headaches. The juice of the leaves is administered internally, and is said to be anthelmintic, antilithic, diuretic, and emmenagogue. The bark and leaves are used internally and externally in leprosy and scrofula. A poultice of the flowers has the reputation of being useful to kill lice and to cure eruptions of the scalp.

(113) *Makarkendu*	... (*Diospyros embryopteris*).—The unripe fruit and bark possess astringent properties.
(114) *Mandagila*	... (*Cæsalpinia bonducella*).—The seed is tonic and antiperiodic, and is largely used by the natives instead of quinine, being pounded with black pepper. The preparation is used as a tonic in fevers, and the powder is also made into an ointment with castor-oil, and applied externally in hydrocele. An oil is extracted from the leaves which is used in palsy and rheumatism. The oil expressed from the seeds is used as a cosmetic. In Persia and India, the seeds are considered to be hot and dry, useful for dispersing swellings, restraining hœmorrhage and keeping off infectious diseases. They are also given internally in leprosy, and are thought to be anthelmintic. Necklaces of the seeds strung upon red silk are worn by pregnant women as a charm to prevent abortion.
(115) *Manjita*	... (*Ruba cordifolia*).—It is largely used to colour medicinal oils and as an astringent, and is considered useful in skin diseases.
(116) *Mansaru*	... (*Arum indicum*).—This is found useful in piles.
(117) *Mansasij*	... (*Cactus indicus*).—The juice of the leaves is used in dropsy and colic.
(118) *Malmatia*	... ( ).—This is a tonic, febrifuge, and vermifuge.
(119) *Mehdi*	... (*Lawsonia alba*).—A decoction of the leaves acts as a remedy for ulcers in the mouth, and in other cutaneous affections.
(120) *Mohan*	... (*Randia dumetorum*).—The fruit and the root-bark are used in medicine; the former is heating and a powerful emetic, used internally in colic, and as an application to swellings.
(121) *Moi*	... (*Odinia wodier*).—A lotion of the decoction of the bark is useful as a remedy for skin diseases and as an astringent gargle.
(122) *Murgali*	... (*Sansievra zeylanica*).—The root is prescribed in the form of electuary in chronic coughs and consumption.
(123) *Murimuri*	... (*Helicteres isora*).—The fruit is made into a liniment for application on sores of the ear. It is also internally prescribed in colic.
(124) *Mutha*	... (*Cyperus longus*).—This is used as a diaphoretic and astringent.
(125) *Nageswara*	... (*Messua ferrea*).—The dried buds are considered a mild remedy for coughs with profuse expectoration. An oil is extracted from the seeds by expression, which is considered an excellent remedy for cutaneous affections.
(126) *Naria*	... (*Cocos nucifera*).—The green fruit is given as a refrigerent; the flowers as an astringent. The oil is a good substitute for cod-liver oil.
(127) *Nirasa*	... (*Memecylon edule*).—An infusion of the leaves is used in inflammation of the conjunctiva.
(128) *Nima*	... (*Meha azadirachta*).—The fruit is used medicinally as an antiseptic, purgative, emollient, and anthelmintic. The bark is known as astringent, tonic, and antiperiodic, and is used in intermittent and other fevers, in constitutional weakness, and during the convalescent state after fever and other diseases. The leaves are stimulant and applied to ulcers and skin diseases of long standing. They are also used in the form of poultices to disperse glandular tumours, and in the form of a pulp in cases of pustular eruptions and small-pox. The oil obtained from the seeds effects suppuration of scrofular glands, and is given in leprosy. The gum is said to have stimulant properties.
(129) *Palas*	... (*Butea fronuosa*).—The seeds are a very powerful anthelmintic, which can be advantageously substituted for santonine. The gum is used in diarrhœa and dysentery. The flowers are given to *enciente* women in cases of diarrhœa, and applied externally in orchitis.
(130) *Paldhua*	... (*Erythrina indica*).—The bark is used as an anti-bilious medicine and as a febrifuge.

(131)	*Pana* ...	... (*Piper betel*).—This is used as a stimulant and expectorant. The root is said to be used to prevent child-bearing.
(132)	*Panus* ...	... (*Artocarpus integrifolia*).—The juice exuding from the trunk is applied externally to glandular swellings and to abscesses to promote suppuration. The tubers, out of which the blossoms sprout, are worn in the waist to cure hydrocele. The young leaves are used in skin diseases, and the root is given internally in decoction in cases of diarrhœa. The leaves are also considered an antidote to snake poison.
(133)	*Patal* ...	... (*Trichosanthes dioica*).—The leaves constitute a bitter tonic. The fresh juice of the unripe fruit is often used as a cooling and laxative adjunct to alterative medicines. In bilious fever, a decoction of *patal* leaves and coriander in equal parts is given as febrifuge and laxative. An alcoholic extract of the unripe fruit is said to be a powerful and safe cathartic. The bulbous part of the root is a hydragogue cathartic.
(134)	*Patuli* ...	... (*Stereospermum suaveolens*).—The bark and the root in decoction are given as a cooling diuretic and tonic. The flowers rubbed with honey check hiccough.
(135)	*Phulsa*	... (*Grewia Asiatica*).—The fruit is supposed to be astringent, and is used to allay thirst and to give tone to the stomach.
(136)	*Phutphatika*	... ( ).—This is used in scabies, and as a poultice in sprains.
(137)	*Pijuri* ...	... (*Psidium pyriferum*).—The bark is used in medicine as an astringent.
(138)	*Pisi* ...	... (*Linum usitatissimum*).—This is used for poultices, and also taken internally in bronchial affections, diarrhœa, dysentery, and visceral inflammation and special diseases.
(139)	*Pitakorwa*	... (*Holarrhena antidysenterica*).—The bark is bitter and astringent, and is a valuable remedy for dysentery. It is also prescribed in hæmorrhoids and fever.
(140)	*Pita nalita*	... (*Corchorus olitorius*).—The bitter leaves are used as an anti-bilious medicine.
(141)	*Puruni*	... (*Bœrhaavia diffusa*).—The root given in infusion is considered laxative, anthelmintic and cooling.
(142)	*Rakta chandana*	... (*Pterocarpus santalinus*).—The wood is an astringent, and an ointment of it is applied externally in headache.
(143)	*Rasi* ...	... (*Sesamum indicum*).—Sesamum seed is considered emollient, nourishing, tonic, diuretic, and lactagogue. It is said to be especially serviceable in piles by regulating the bowels and removing constipation. Ground to a paste with water, it is given with butter in bleeding piles. Sweetmeats made of the seed are also beneficial. A poultice of the seed is applied to ulcers; a powder made from the roasted and decorticated seed is used as an emollient both externally and internally. Both the seed and the oil are used as demulcent in dysentery and urinary diseases. Sesamum oil has been employed as a substitute for olive oil in the preparation of *Linimentum calcis*. The seed, if taken largely, is capable of producing abortion. In amenorrhœa a warm sitz-bath containing a handful of seeds has been found very efficacious. In decoction the seed is said to be emmenagogue; the same preparation sweetened with sugar is prescribed in cough; a compound decoction with linseed is used as an aphrodisiac; a plaster is applied to burns, scalds, &c.; a lotion from the leaves is used as a hair-wash, and is supposed to promote the growth of the hair and make it black; a decoction of the root is said to have the same properties.
(144)	*Salparni*	... ( ) This is used as a febrifuge and tonic.
(145)	*Salua* ...	... (*Shorea robusta*).—The resin is used to form plasters, as an application to indolent ulcers, and internally as a stimulant, and also in special diseases.

(146) *Saonraj*	(*Veronia anthelmintica*).—The seed is of great repute as a medicine for white leprosy and other skin diseases. It is used internally for removing phlegm and intestinal worms, and in the form of poultice and plasters it is used to disperse cold tumours. The seed is also a valuable tonic, stomachic and diuretic. It is given in anasarca and used in plasters for abscesses.
(147) *Serissa*	(*Mimosa serissa*).—The leaves and flowers are used in fevers and cutaneous affections.
(148) *Simul*	(*Bombax malabaricum*).—The gum is a valuable aphrodisiac, and is efficacious as an external applicant to swellings of the limbs. The root is stimulant and tonic, and emetic in large doses. The leaves are employed as an aphrodisiac, and in special diseases.
(149) *Sonamukhi*	(*Cassia obovata*).—The leaves are used as a purgative.
(150) *Sonari*	(*Cassia fistula*).—The pulp of the fruit or the root-bark is generally used as a simple purgative. This drug is described as lenitive and useful in relieving thoracic obstructions. It is often combined with tamarind. Externally it is useful in gout and rheumatism. The flowers are made into a confection known as *gul-kund*; this is viewed as a febrifuge. The bark and the leaves, like those of most other species of this genus, are valued for external applications in skin diseases.
(151) *Suam*	(*Soymida febrifuga*).—The bark is bitter and astringent, useful in fevers and disorders of the bowels.
(152) *Suanoi*	( ).—This is used as a tonic, febrifuge, vermifuge and purifier of the blood.
(153) *Sujna*	(*Moringa pterygosperma*).—The root-bark, which smells like horse-radish, is poisonous, and is used as a vesicant, and considered a good remedy in bites by rabid animals, in paralysis, epilepsy, and hysteria. The seeds also possess pungent and stimulant properties, and they yield an oil which is considered aperient, and is much used in gout and rheumatism.
(154) *Tala*	(*Borassus flabelliformis*).—The juice of the fresh petioles is given as a stimulant and antiphlegmatic. It is also used as an adjunct in stimulant drugs given in the low stages of intermittent and remittent fever. The ash of the dry spidan of barren trees is anti-acid and is largely used in heartburn; it also acts as a powerful blister, and is therefore applied in cases of enlarged liver and spleen in combination with some demulcent substance. The water inside the seeds of the green fruit is refrigerant and diuretic, and is given to check hiccough. The pulp of the ripe fruit is applied externally in skin diseases. The juice is diuretic and is prescribed in chronic gonorrhœa.
(155) *Talmuli*	(*Curculigo orchioides*).—This is considered a valuable medicine in special diseases. The rootlets are said to possess astringent and tonic properties.
(156) *Tentuli*	(*Tamarindus indica*).—The ripe fruit is refrigerant, digestive, carminative, and laxative, useful in bilious disorders, such as burning of the body, costiveness, and in intoxication from spirituous liquors or datura, &c. The shells of the ripe fruit are burnt and their ashes used in medicines as an alkaline substance, along with other medicines of the sort. The pulp of the ripe fruit, as well as a poultice of the leaves, is recommended to be applied to inflammatory swellings. A gargle of tamarind water is recommended in sore-throat. The seed is said to be astringent and used as a poultice to boils. The leaves crushed with water and expressed yield an acid fluid, useful in bilious fever and scalding of the urine; made into a poultice, they are applied to reduce inflammatory swellings and to relieve pain. A poultice of the flowers is used in inflammatory affections of the conjunctiva; the juice expressed from them is given internally for bleeding piles. The bark is considered to have astringent and tonic properties.
(157) *Tutkan*	(*Morus indicus*).—The fruit is useful for sore throat, dyspepsia, melancholia and as a refrigerant in fever. The bark is regarded as a purgative and vermifuge.

SECTION 5.

TREES AND PLANTS YIELDING DYES AND TANS.

The following list enumerates and describes the trees and plants in Cuttack which yield dyes and tans :—

(1) *Achu* ...	(*Morinda tinctoria*).—The root, bark, and stems are used for dyeing. The bark is said to yield a dye inferior to that given by the roots.
(2) *Amba* ...	(*Mangifera indica*).—A fleeting green dye is obtained from the bark which is not useful for colouring fabrics.
(3) *Aonla* ...	(*Phyllanthus emblica*).—The fruit, bark, and leaves are used in dyeing and tanning. The dye from the fruit is a blackish grey, and is extracted by crushing and boiling the fruit in hot water. A blackish grey dye is also produced by mixing an infusion of the fruit with the protosulphate of iron.
(4) *Arjuna* ...	(*Terminalia arjuna*).—The bark is used in dyeing and tanning. Cloth is dyed light brown with *arjun*. When used with the *Acacia Arabica* it yields a black dye.
(5) *Asan* ...	(*Terimnalia tomentosa*).—The bark is used to give a brown colour.
(6) *Bahara* ...	(*Terminalia belerica*).—The leaves and fruit are used in tanning. The fruit (beleric myrabolam) is also largely used in dyeing. It is used as a dye stuff in the same way as *harida*.
(7) *Bakam* ...	(*Cæsalpinia sappan*).—This tree grows abundantly in Cuttack, and especially in thanas Jagatsingpur and Salipur. The wood yields a brick-red dye, which is obtained by boiling.
(8) *Bakusa* .	(*Adhatoda vasica*).—The leaves and fruit on being soaked yield a black dye.
(9) *Bhelia* ...	(*Semicarpus anacardium*).—The fruit yields a dark grey or black dye stuff.
(10) *Chakunda* ...	(*Cassia tora*).—The use of the dye is not known to the Uryas. Mr. Wardle of Leek, in experimenting with the seeds of this shrub, discovered that they yield a beautiful yellow colour which may be usefully employed in silk dyeing.
(11) *Ganga sheoli* ...	(*Nyctanthes arbortristis*).—The lower portion of the corolla of the flower yields the dye material. The dried flowers are boiled or steeped in water until the colour is extracted, which in a fabric appears as a bright orange.
(12) *Gulbas* ...	(*Bixa orellana*).—The pulpy covering round the seeds gives the dye known in commerce as *arnatto*. The pulp itself yields a flesh colour, but it is altered by certain combinations into orange, deep orange, or red.
(13) *Gundi* ...	(*Mallotus philippinensis*).—The dye stuff is obtained from the red powder which is found inside the capsules of the ripe fruit. It is used in dyeing silk and cotton, being prepared by mixing it with a solution of the ashes of the *Amaranthus spinosus*, and with alum. The bark may be used in tanning.
(14) *Haldi* ...	(*Curcuma longa*).—The rhizomes yield a valuable yellow dye which with alkalis changes into deep red.
(15) *Harida* ...	(*Terminalia chebula*).—The bark and fruit are used both for tanning and dyeing. The fruit, which is known as the "black myrabolam," yields with iron salts a black dye, with turmeric and indigo a green dye, and with catechu a brown dye. In Cuttack it is generally used for producing a black colour: an infusion of the fruit is prepared, to which when irondust or filings is added, a black colour is produced.
(16) *Harwari* ...	(*Woodfordia floribunda*).—The flower gives a red colour, but it is scarcely used as a dye. The leaves are useful for tanning.
(17) *Kantamaris* ...	(*Amaranthus spinosus*).—The ashes of the burnt wood of this plant are used in dyeing with *gundi*.
(18) *Kuchila* ...	(*Strychnos nux vomica*).—The seed used in combination with protosulphate of iron dyes fabrics dark brown.
(19) *Kunti* ...	(*Cæsalpinia digyna*).—The legumes are used as a tan.

(20) *Kusuma*	(*Carthamus tinctorius*).—The flowers are pounded and then steeped in cold water. The yellow colouring principle is thus first extracted, and when this is done some alkaline substance, such as wood-ashes, is added to the flowers along with water in order to dissolve the red colouring matter. Safflower is thus used for dyeing cloth both red and yellow.
(21) *Ladhu*	(*Symplocos racemosa*).—The bark is used for obtaining a red dye with lac, alum, and turmeric, and also in tanning.
(22) *Manjita*	(*Rubia cordifolia*).—The wood is bruised and then boiled with water. On cooling, it is mixed with alum. Cloth steeped in this mixture is dyed deep red.
(23) *Mehdi*	(*Lawsonia alba*).—This plant yields a fleeting dye, which is not very useful for fabrics.
(24) *Nila*	(*Indigofera tinctoria*).—This dye plant is grown only to a limited extent.
(25) *Palas*	(*Butea frondosa*).—The dye is extracted from the dried flower-petals, the colour being yellow; lac is also obtained from its branches.
(26) *Panus*	(*Artocarpus integrifolia*).—The wood, reduced to sawdust, yields a yellow dye.
(27) *Pijuri*	(*Psidium pyriferum*).—The bark and the leaves may be used in dyeing and tanning.
(28) *Rakta chandan*	(*Pterocarpus santalinus*).—The wood yields a dye stuff which imparts a pale pink colour to cloth.
(29) *Salua*	(*Shorea robusta*).—The bark is said to yield red and black dyes, and also serves as a tan.
(30) *Sonari*)	(*Cassia fistula*).—The bark is used in tanning.

The descriptions above have been taken from Dr. M'Cann's "Dyes and Tans" of Bengal, and from the Catalogues of Indian products prepared by Dr. Watt and Mr. T. N. Mukharji.

SECTION 6.

TREES YIELDING GUMS AND RESINS.

The following list gives the Urya and botanical names of the trees yielding gums and resins:—

(1) *Amba* (*Mangifera indica*).
(2) *Arjuna* (*Terminala arjuna*).
(3) *Asan* (*Terminalia tomentosa*).
(4) *Bahara* (*Terminalia belerica*).
(5) *Bela* (*Aegle marmelos*).
(6) *Bhelia* (*Semicarpus anacardium*).
(7) *Bhendimardan* (*Sterculia urens*).
(8) *Dhan* (*Anogeissus latifolia*).
(9) *Gaira* (*Acacia leucoplœa*).
(10) *Gotakat* (*Zizyphus rugosa*).
(11) *Kantapalas* (*Cocchlospermum gossypium*).
(12) *Kathbela* (*Feronia elephantum*).
(13) *Kendu* (*Diospyros melanoxylon*).
(14) *Khajuri* (*Phœnix sylvestris*).
(15) *Kumbi* (*Careya arborea*).
(16) *Moi* (*Odinia wodier*).
(17) *Nima* (*Melia azadirachta*).
(18) *Palas* (*Butea frondosa*).
(19) *Piasal* (*Pterocarpus marsupium*).
(20) *Salua* (*Shorea robusta*).
(21) *Simul* (*Bombax malabaricum*).
(22) *Sonari* (*Cassia fistula*).
(23) *Sujna* (*Moringa pterygosperma*).

SECTION 7.

TREES AND PLANTS YIELDING OILS USED FOR THE KITCHEN, FOR BURNING AND AS MEDICINES.

The list given below enumerates the trees and plants from which oils may be obtained:—

(1) *Bahara* (*Terminalia belerica*).
(2) *Bhelia* (*Semecarpus anacardium*).
(3) *Ganga sheoli* (*Nyctanthes arbor tristis*).
(4) *Gundi* (*Mallotus philippensis*).
(5) *Jara* (*Ricinus communis*).
(6) *Kapas* (*Gossypium herbaceum*).
(7) *Karanj* (*Pongamia glabra*).
(8) *Kathbela* (*Feronia elephantum*).
(9) *Kusuma* (*Carthamus tinctorius*).
(10) *Lanka amba* (*Anacardium occidentale*).
(11) *Lembu* (*Citrus indica*).
(12) *Mahul* (*Bassia latifolia*).
(13) *Makarkendu* (*Diospyros embryopteris*).
(14) *Manda gila* (*Cæsalpinia bonducella*).
(15) *Mehdi* (*Lawsonia alba*).
(16) *Naria* (*Cocos nucifera*).
(17) *Nima* (*Melia azadirachta*).
(18) *Pisi* (*Linum usitatissimum*).
(19) *Sarisha* (*Brassica campestris*).
(20) *Sujna* (*Moringa pterygosperma*).
(21) *Tentuli* (*Tamarindus indica*).
(22) *Til* (*Sesamum indicum*).

SECTION 8.

UNCULTIVATED TREES AND PLANTS YIELDING FIBRES.

The following list gives the names of the uncultivated trees and plants yielding fibres. A short description is added in each case:—

(1)	*Akunda*	(*Calatropis gigantea*).—The silky floss in the seed is useful for stuffing pillows. Fibre may be also obtained from the bark, but it is of very short staple.
(2)	*Asan*	(*Terminalia tomentosa*).—A fibre may be obtained from the bark.
(3)	*Ata*	(*Anona squamosa*).—An inferior quality of fibre may be prepared from the twigs of the tree.
(4)	*Bar*	(*Ficus indica*).—A coarse rope may be made from the bark and aerial roots.
(5)	*Bhendi mardan*	(*Sterculia urens*).—The inner bark yields a light-coloured fibre.
(6)	*Gaira*	(*Acacia leucoplœa*).—A coarse fibre may be extracted from the bark useful for rough cordage and fishing nets.
(7)	*Jainti*	(*Sesbania ægyptica*).—The bark may be made into a rough cordage.
(8)	*Kanta baunsa*	(*Bambusa arundinacea*).—The fibre extracted from the young shoots would make excellent paper, but there are practical difficulties which almost preclude the possibility of bamboo ever becoming a paper supply to any appreciable extent.
(9)	*Kantapalas*	(*Cocchlospermum gossypium*).—The fibre which may be obtained from this plant is soft and silky.
(10)	*Khajuri*	(*Phœnix sylvestris*).—The fibrous leaflets and the fibre from the petioles are made into mats, ropes, and baskets.
(11)	*Kia*	(*Pandanus odoratissimus*).—Fibre may be obtained from the leaves and stem.
(12)	*Kumbi*	(*Careya arborea*).—The bark yields a fibre suitable for cordage.
(13)	*Mewa*	(*Anona reticulata*).—The bark of the young twigs yields a good fibre.
(14)	*Moi*	(*Odinia wodier*).—A coarse fibre may be obtained from the inner bark.
(15)	*Muri muri*	(*Helecteres isora*).—The branches yield a fibre suitable for the manufacture of coarse cordage, and of a kind of gunny bags.
(16)	*Nima*	(*Melia azadirachta*).—The bark yields a fibre.
(17)	*Palas*	(*Butea frondosa*).—The root bark yields a rough cordage.
(18)	*Sialinoi*	(*Bauhinia vahlii*).—A strong cordage may be made from the bark.
(19)	*Simul*	(*Bombax malabaricum*).—The cotton obtained from this tree is useful for stuffing pillows, &c.; the inner barks of the stem and of the branches also yield good fibres suitable for cordage.

CHAPTER X.

CHIEF OR DISTINCTIVE FAUNA.

The principal fauna of the district are as follow:—

I. *Mammals*—

Order.	*Common name.*	*Scientific name.*
Carnivora	Tiger	Felis tigris.
	Leopard	Felis leopardus.
	Wild cat	Felis chaus.
	Indian civet cat	Viverra zibetha.
	Small civet	Viverricula malaccensis.
	Grey mongoose	Herpestes mungo.
	Ruddy mongoose	Herpestes smithii.
	Striped hyæna	Hyæna striatus.
	Wild dog	Cuon dukhunensis.
	Jackal	Canis aureus.
	Indian fox	Vulpes bengalensis.
	Indian ratel	Mellivora indica.
	Common otter	Lutra vulgaris.
	Indian black bear	Melursus ursinus.
Rodentia	Indian red squirrel	Sciurus indicus.
	Palm squirrel	Sciurus palmarum.
	Bandicoot rat	Nesokia bandicota.
	Brown rat	Mus decumanus.
	Porcupine	Hystrix leucurus.
	Indian hare	Lepus ruficaudatus.

Order.	*Common name.*	*Scientific name.*
Ungulata	Buffalo (domestic)	Bos bubalus.
	Ox (do.)	Bos species.
	Sheep (do.)	Ovis aries.
	Goat (do.)	Capra œgagrus.
	Horse (do.)	Equus caballus.
	Ass (do.)	Equus asinus.
	Hog (do.)	Sus species.
	Wild boar	Sus cristatus.
	Sambur	Cervus aristotelis.
	Spotted deer	Cervus axis.
	Mouse deer	Tragulus memminna.
	Black buck	Antelope cervicapra.
Proboscidea	Elephant	Elephas indicus.
Cetacea	Porpoise	Delphinus species.
Edentata	Scaly ant-eater	Manis pentadactyla.
Primates	Baboon	Semnopithecus entellus.
	Common monkey	Macacus rhesus.
Chiroptera	Flying fox	Pteropus medius.
	Common bat	
Insectivora	Shrew	Crocidura cœrulescens.

II. *Birds.*—The following list, which has been taken from Mr. Taylor's report, gives the names of the common game birds of Khurda. It is reproduced here as it fairly represents the different kind of game birds to be found in Cuttack :—

Common name.	Scientific name.	Urya name.
Pea fowl, common	Pavo cristatus	Majur, male called Nanja.
Red jungle fowl, common	Gallus ferrugineus	Kukura, male called Ganja.
Red spur fowl, common	Galloperdix spadiceus	Kainjar.
Painted spur fowl, rare	Ditto lunulatus	Ditto.
Grey partridge	Ortygornis pondicerianus	Hatia gundri.
Common quail	Coturnix communis	Gundri.
Rain do.	Ditto coromandelica	
Bush do.	Perdicula asiatica	
Button do.	Turnix joudera	
Indian bustard do.	Ditto taigoor	
Common snipe	Gallinago cœlestis	Chaha.
Pintail do.	Ditto sthenura	
Jack do.	Ditto gallinula	
Painted do.	Rhyncœa capensis	
Grey duck	Anas porcilorhyncha	Bhera.
Comb do.	Sarcidiornix melananotus	Naki hanse.
Pink head do.	Rhodonessa caryophyllacea	......
Whistling teal	Dendrocygna javanica	Hansrali.
Larger do.	Ditto fulva	Ditto.
Cotton do.	Nettopus coromandelianus	Dandana.
Grey lag goose	Anser cinereus	Rajhanse.
Barred headed do.	Do. indicus	Kajo.
Ruddyshell drake	Casarca rutila	Kesar-pandia.
Burrow duck	Tadorna cornuta	......
Shoveller	Spatula clypeata	......
Gadwal	Chaulelasmus strepens	......
Pintail	Dafila acuta	Narija.
Common teal	Querquedula crecca	Gendu.
Garganey or blue-winged do.	Ditto circia	
Pochard	Fuligula ferina	
Red-crested do.	Ditto rufina	
White-eyed do.	Ditto nyroca	Balehans.
Flamingo	Phœnicopterus roseus	Era.
Demoiselle crane	Anthropaides virgo	Garara.
Ibis, sacred	Ibis, religiosa	Dabetia.
Do., glossy	Do., species	......
Do., species	Do., falcinellus	......
Curlew	Memenius arquatus	......
Blue coot	Porphyris poliocephalus	Kaimo.

Besides these may be mentioned the *kau* (crow), *chil* (kite), *shargana* (vulture), *charai* (sparrow), *tia* (parrot), *sua* (*paraqueet*), *sochara* (*bulbul*), *maina* (*maina*), *kajalpathi* (kingcrow), *gorra* (crane), *gendalia*, *panikua* (kingfisher), *chakachaki*, *bani*, *gakalika*, *kabti*, *dhanka*, *chiltar*, *karuan*, *maura*, *baja*, *baira*, *chanchan*. Many are found to be destructive to crops, *e.g.*, the *hanshrari*, *kum*, *sua*, *baiachari*, *gorra*, *kunja*, *daktob*. Among the fish-eating birds the most common are the *karicharai*, *murar*, *matiachil*, *baga*, *barakanka*, *chatura*, *araya*, *chaitua*, *karkari*, *kagara*, *sikari*, *biasdeb*, *kuruna*, *charata*, *gaya*, *chakua*.

III. The following is a list of the more important fishes found in Cuttack:—

Urya names.	Bengali names.	Scientific names.
Andi	......	Macrones aor.
Bachua	Bacha	Psendentropus marius.
Balia	Boâl	Wallago attu.
Bami	......	Mastacemblus armatus.
Bankui	Dankona	Barbus ambissis.
Baro chenga	......	Ophiocephelus barea.
Bhakura	Katla	Catla buchanani.
Bhekta	Bhetki	Lates calcarifer.
Budhasi	Gudha	Nanolus marmoratus.
Chandi nalua	......	Ambassis nalua.
Chandi	Chandi	Ambassis gymnocephalus.
Chenga	......	Ophiocephelus gachua.
Chial	Chital	Notopterus chitala.
Eleesheo	Ilisha	Clupea ilisha.
Gantia	......	Macrones cavasins.
Golaree	......	Otolithus argentens.
Gonia	......	Saurus indicus.
Goraye	Latta	Ophiocephelus punctatus.
Kakonda	Kharsula	Mugil corsula.
Kaka chia	......	Barbus tario.
Kalabaishi	Kala-bainsi	Labeo nigrescens.
Kala hattoli	......	Labeo boga.
Kantia	Tengara	Macrones vittatus.
Kerandi	Punti	Barbus pinnauratus.
Khangra	......	Mugil species.
Khasoli	......	Trichogaster fasciatus.
Khurosia	Kurchi	Labeo gonius.
Kochia	......	Amphiprons cuchia.
Korsa	Khalisha	Labeo pangusia.
Kow	Coi	Anabas scandens.
Kuji bhekti	......	Chrysophrys berda.
Kuji kerandi	Phutuni, Punti	Chrysophrys berda.
Magoori	Mágur	Clarias magur.
Makindi	......	Chatoessusmodestus.
Mirkali	Mirgel	Cirrhina mriguli.
Mowrali	Mourulla	Amblypharyngodon molo.
Newa tengara	......	Macrones seenghala.
Pabada	Pabdâ	Collichrous checkra.
Pahara	Batta	Labeo bata.
Pangas jalang	......	Pseudentropius buchanani.
Panja gagah	......	Macrones corsula.
Pania	......	Pseudentropius garua.
Pania khya	......	Barbus tor.
Patia kerandi	......	Barbus stigma.
Patuli	......	Ailia coila.
Phali	Phalui	Notopterus kapirat.
Phirki	......	Stromatens cinerens.
Pita kerandi	......	Barbus chola.
Ruhi	Rui	Labeo rohita.
Selanda	......	Silundia gangetica.
Seol	Soal	Ophiocephelus striatus.
Serana	Sarana	Barbus serana.
Sila	......	Ophiocephalus striatus.
Singi	Singi	Saccobranchus fossilis.
Thuri	......	Rhynchobdella acerbata.
Tori	......	Mastacembelus puncalus.

IV. *Reptiles.*—The principal reptiles are the alligator, turtle, tortoise, frog, lizard, chameleon, centipede and snake. Of snakes, there are several kinds, such as the *chakra bara*, *gokhor*, *dhamana*, *rana*, *matia tampa*, *kintia*, and *dhanda.*

V. *Insects.*—Under this head is inserted below an interesting list of butterflies taken from Mr. Taylor's Completion Report of the Survey and Settlement of Khurda. The list fairly represents the different varieties to be found in the district of Cuttack :—

Family I.—Nymphalidœ.

GENUS.	SPECIES.
Danais	Grammica.
Do.	Limniacæ.
Do.	Septentrionis.
Do.	Chrysippus.
Do.	Alcippus.
Do.	Genutia.
Do.	Hegisippus.
Emplœa	Kollari.
Do.	Kalinga.
Do.	Core.
Do.	Coreoides.
Mycalesis	Medus.
Do.	Runika.
Do.	Blasius.
Do.	Mineus.
Do.	Drusia.
Do.	Perseus.
Do.	Visala.
Do.	Rudis.
Lethe	Europa.
Do.	Todara.
Ypthima	Philomela.
Do.	Hubneri.
Do.	Ceylonica.
Melanitis	Leda.
Do.	Ismene.
Do.	Duryodana
Do.	Zitenius.
Elymnias	Undularis.
Telchinia	Violœ.
Precis	Iphita.
Junonia	Atlites.
Do.	Asteriœ.
Do.	Almona.
Do.	Orithia.
Do.	Lemonias.
Do.	Œnone.
Charaxes	Fabius.
Do.	Athamus.
Do.	Imna.
Symphœdra	Nais.
Euthalia	Garuda.
Do.	Lepedia.
Do.	Lubentina.
Kallima	Inachis.
Ergolis	Indica.
Do.	Merione.
Cyrestis	Formosa.
Do.	Cocoles.
Limenitis	Procris.
Neptis	Hordonia.
Do.	Varmona.
Do.	Columella
Do.	Adara.
Do.	Jumba.
Do.	Viraja.
Rahinda	Plagiosa.
Athyma	Perius.
Do.	Inarina.

Family I.—Nymphalidœ—*concld.*

GENUS.	SPECIES.
Hypolimnas	Bolina.
Do.	Jacintha.
Do.	Misippus.
Cethosia	Cyane.
Atella	Phalanta.
Do.	Sinha.
Pyrameis	Cardui.

Family II.—Erycinidœ or Lemonudœ.

GENUS.	SPECIES.
Abisara	Suffusa.

Family III.—Lycœnidœ.

GENUS.	SPECIES.
Curetis	Thetys.
Do.	Bulis.
Spalgis	Epius.
Pithecops	Hylax.
Megisba	Thwaitesii.
Do.	Malaya.
Pathalia	Albidisca.
Cyaneris	Puspa.
Chilades	Laius.
Do.	Putli.
Azanus	Ubaldus.
Do.	Crameri.
Zizera	Karsandra.
Do.	Maha.
Do.	Sangra.
Do.	Chandola.
Do.	Pygmœa.
Tarucus	Theophrastus.
Do.	Plinius.
Castalius	Rosimon.
Do.	Roxus or elna.
Do.	Dicidua.
Do.	Hamatus.
Do.	Interruptus.
Do.	Ananda.
Nacaduba	Ardates.
Do.	Species.
Everes	Parrhassius.
Jamides	Bochus.
Do.	Species.
Catochrysops	Strabo.
Do.	Cnejus.
Do.	Pandava.
Do.	Species.
Lampides	Ælianus.
Do.	Elpis.
Polyommatus	Bœticus.
Scolitantides	Nyseus.
Lycœnesthes	Lycœnina.
Do.	Lycambes.
Do.	Orissica.
Do.	Bengalensis.
Catapæcilma	Elegans.
Horaga	Ciniata.
Spindasis	Vulcanus.

Family III.—Lycœnidœ—*concld.*

GENUS.	SPECIES.
Spindasis	Iotis.
Do.	Elima.
Do.	Tigrinus.
Do.	Khurdanus.
Do.	Orissanus.
Do.	Trifurcatus.
Do.	Lilacinus.
Tajuria	Longinus.
Do.	Jalindra.
Do.	Jehana.
Virachola	Perse.
Do.	Isocrates.
Sithon (Rahinda)	Amor.
Sithon	Indra.
Hoypolycœna	Etolus.
Iraota	Timoleon.
Nilasara	Amantes.
Satadra	Atrax.
Amblypodia	Naradoides.
Surendra	Quercetorum.
Rapala	Varuna.
Do.	Pitosiris.
Do.	Sehitacea.
Do.	Lazulina.
Deudorix	Epijarbas.
Barpa	Melampus.
Loxura	Atymnus.

Family IV.—Papilionidœ.

GENUS.	SPECIES.
Nichitonia	Xiphia.
Terias	Harina.
Do.	Heccabe.
Do.	Lœta.
Do.	Brigitta.
Do.	Venata.
Do.	Rubella.
Do.	Drona.
Catopsilia	Pyranthe.
Do.	Gnoma.
Do.	Crocale.
Do.	Catilla.
Do.	Chryseis.
Ixias	Anexibia.
Do.	Agniverna.
Do.	Species.
Hebomoia	Glaucippe.
Callosuni	Etrida.
Do.	Amata.
Idmais	Surya.
Catophaga	Paulina.
Appias	Libythia.
Do.	Hippoides.

Family IV.—Papilionidœ—*concld.*

GENUS.	SPECIES.
Haphina	Phryrne.
Belenois	Messentina.
Nepheronia	Valeria.
Delias	Eucharis.
Do.	Ethiri.
Papilio	Erithonius.
Do.	Crino.
Do.	Dismilis.
Do.	Panope.
Do.	Hector.
Do.	Aristolochiœ.
Do.	Polymnestcr.
Do.	Telephus.
Do.	Nomius.
Do.	Antiphates.
Do.	Pammon.

Family V.—Hesperidœ.

GENUS.	SPECIES.
Badamia	Exclamationis.
Suastus	Gremius.
Do.	Aditus.
Parata	Chromus.
Do.	Alexis.
Astictopterus	Stellifer.
Ampittia	Maro.
Gangara	Thyrsis.
Baoris	Oceia.
Do.	Kumara.
Parnara	Bada.
Chapra	Mathias.
Telicota	Bambusœ.
Padraona	Dara.
Cupitha	Purrea.
Taractrocera	Sagara.
Halpe	Beturia.
Hyarotis	Adrastus.
Tagiades	Ravi.
Do.	Alica.
Do.	Atticus.
Udaspes	Folus.
Plesioneura	Praba.
Do.	Restricta.
Do.	Alysos.
Do.	Leucocera.
Coladenia	Indrani.
Tapena	Thwaitesi.
Abaratha	Ransonneti.
Do.	Taylorii.
Satarupa	Bhagava.
Hesperia	Galba.
Matapa	Aria.

No attempt has been made to enumerate the numerous kinds of insects to be found in the district. They are very much the same as those to be met with in Bengal. Those which prove destructive to crops have been mentioned and described in a previous chapter.

CHAPTER XI.

MINERALS.

Laterite.—There are no mines in the district, but there is a large abundance of laterite which is extensively quarried for road metal and building purposes. The most important of these quarries seem to be situated in the Jajpur subdivision in pargana Olash and in Killas Darpan, Chowsatipara, and

Sukinda. The quarry at Darpan is the private property of the Raja of Darpan. There is also a large Public Works Department quarry at Emamnagar, situated on the High Level Canal. Quarries are also worked at Neulpur and Kanpur. Two descriptions of this stone are used for building purposes by the authorities of the Public Works Department, of which the one is dark coloured and close grained, and the other light coloured and of a looser texture. The former weighs 156 lbs. to the cubic foot and the latter 130 lbs.

Sandstone.—Sandstone, which is found in some of the hills on the western frontier of the district, is also quarried for building. It is obtained both in a fine grained and coarse grained condition. The weight of a cubic foot varies from 140 to 145 lbs. In Atgurh, which adjoins the Cuttack district, sandstones are to be found varying from the close grained white stone to the hard red sandstone. The former are used for making cups and tubs, and grinding stones, and also for building. The latter were used extensively in ancient days for building temples. Their durability is evident from the substantial condition of these ancient temples which are still to be seen in several parts of Orissa.

Ghutin.—Ghutin, which is a nodulous limestone, is found in the beds of many of the deltaic rivers of the district. It is met with extensively in the beds of the Kharsua, Brahmani and Baitarani, and is scattered over most of the *nalas* in the vicinity of the hills. In some cases it occurs considerably below the delta heads of the rivers. Locally it is known as *Genguti.* Limekilns for burning this stone are to be seen in many parts of the district. The work is generally taken by contractors. The following particulars will give an idea of these kilns. The dimensions of an ordinary kiln which was built up from mud taken from the banks of the stream from which the nodules themselves were obtained, were found by me at a village near Tanghi to be—height 7 feet and diameter 6 feet. The thickness of the mud wall was 1½ feet. The cost of the construction of the kiln was Re. 1, of the coal used for one output of lime Rs. 8, of *genguti* Rs. 4, and of labour for each output Rs. 2, making a total of Rs. 15. Each burning was calculated to yield an output of 100 maunds of lime, which at the rate of 5½ maunds per rupee in the villages would represent a money value of Rs. 18, leaving thus a margin of profit amounting to Rs. 3 per 100 maunds. The time taken in turning out this quantity would not be under five or six days. I was told at this village that the manual labour in such kilns is done entirely by low-caste people, such as Pans. A cubic foot of the nodule lime as taken from the kilns and slaked, weighs 74 lbs., and after it has been riddled, the weight is 64 lbs. Before calcination the *genguti* or limestone weighs about 90 lbs. per cubic foot.

Chlorite.—Chlorite (*magni*) has been reported to exist in Sukinda. It was formerly largely used by the Uryas in sculpture. The images of many gods and goddesses are now to be seen among the antiquities of the district, all made from this durable stone.

Coal.—Coal has been suspected in Orissa, and there are indications of this mineral presented also at Naraj, situated only six miles from the Sadar station of the district. There are coal-fields, too, in the Tributary State of Talcher, and in the Government estate of Angul on the west of the district. The following account has been taken from the annual report of the Commissioner of the Orissa Division for the year 1873-74:—"The experiment in coal getting in Talcher has been very successful both in quality and quantity. The Talcher coal-field has been found to be more extensive than was at first supposed, and specimen have been obtained from the adjoining Angul estate at a place called Patapara, some 30 or 40 miles north-west of the Talcher beds. The coal got in Talcher, 80 tons, has been brought by the Brahmani river, and will come down by the first flood by boat to Cuttack when it will be practically tested. The Talcher Gopal Prosadi coal is rather below the average quality of Indian coal, but still a fair fuel." In the following year (1874-75), it was reported by the Commissioner that the coal obtained from Talcher was tested in the Cuttack workshop as steam fuel, when it was found to be "good average useful coal," but the great distance of these coal-fields from the closest means of water communication stood greatly in the way of its extended use. This same difficulty was felt ten years later in 1883, when the Commissioner, referring to the same coal-fields, reported that the mines were not worked, as there was no local demand in Talcher or Angul for the article, fuel being got in abundance from the forests. He was also of opinion that it would not pay to convey the coal to Bengal. With the railway scheme, at present, however, the fields in question may prove very valuable.

Iron ore.—Iron ore is to be found all over the Garjat hills, and is said to give from 40 to 64 per cent. of iron. The hills of Sukinda are worked to a limited extent, the ironstone obtained from them and from all the Garjat hills being smelted on the western frontier of the district by people of low caste, such as the *Kols* or *Bhumiges.*

These people, who make the manufacture of iron their sole means of livelihood, generally live on the sides of the hills. Having selected a spot where the stone is to be found, they burn the jungle on the surface and then cut out huge blocks of stone which are next hammered into smaller bits by an iron instrument called the *hathura.* The earth all round is removed by a pointed iron rod called the *malakura*, and the pieces are then ground into a powdery dust by hammering them with larger bits of stone. From this dust, the iron is manufactured. A furnace having been constructed on the ground, the dust is placed within it, and heated above and below with coals. A very high but uniform heating is kept up by means of an earthern pipe communicating with a pair of bellows worked with the hands and feet. The dust is introduced into the bed of the furnace by an iron spoon called the *salankuri* or *danka*, and when smelted is separated from the charcoal which covers it. Four men working throughout the whole day are able to manufacture three seers of this coarse iron.

The *lohars* who purchase the iron from the *kols* have to refine it and remove all impurities before they can put it to any use. The above quantity of the coarse iron would in the hands of the *lohars* be reduced to 2¼ seers, and would then sell at the rate of 2 annas per seer of 80 tolahs.

Clay.—Clay is largely used for pottery. The kind taken by the potter is locally known as *chikita.* It is a stronger and more sticky clay than the *chikita* of the cultivator, and is found at a depth of three or four feet in the *jhores* and pools of the district.

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Asst. to Director of the Dept. of Land Records
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The 8*th March* 1893.

APPENDIX I.

JURISDICTIONS.

(1) *Area, boundaries and subdivisions.*—The boundaries of the district have been given in Chapter I.

The area of the district, subdivision by subdivision, is given in the following table, the figures of which have been compiled from the latest reports obtained in the Collectorate :—

Name of sub-division.	Total area of sub-division in square miles.
Sadar	989
Banki	120
Kendrapara	1,424
Jajpur	1,104
District Total ...	3,637

The area of the district, as given in the Census Returns, is only 3,633 square miles. In the Census Report, the area of Banki has been shown as 116 square miles only, while in the completion report of the Banki Settlement, the area as given by the Manager in charge of the estate, is 120 miles. The latter figure has been adopted by me.

The subjoined table gives the areas and names of subdivisions as they were divided in the year 1870-71 (twenty years ago) :—

Name of sub-division.	When established.	Area in square miles.
Sadar	......	675
Kendrapara	29th January 1859	617
Jajpur	„	1,154
Jagatsingpur	20th March 1867	732
	District Total ...	3,178

(2) *Fiscal divisions.*—In Dr. Hunter's Statistical Account of Cuttack, the number of *parganas* given on page 232 is 80. This list was obtained from the Returns of the Surveyor-General, and does not apparently agree with the list given by Dr. Hunter on page 223, where the number of Fiscal Divisions as taken from the Settlement Records and from the Board of Revenue's pargana Statistics is shown as 89. This number should really be 90, as, on turning over to page 224 of Dr. Hunter's Report, it will be seen that in the enumeration the figure 8½ appears after 8, so that the correct number may be taken as 90 instead of 89. The list which is now subjoined has been taken by me with the aid of the Sadar kánungo from the *tauzi* books of the Collectorate. The number of parganas is shown as 90, agreeing with the number on page 223 of Dr. Hunter.

The differences between the Survey List on page 233 of Dr. Hunter and the subjoined list or the list on page 223 of Dr. Hunter are explained thus :—

In the Survey List, Kayama and Kayama Kila appear separately, while in the other two lists Kayama includes both the divisions. This would bring down the number of the Survey List from 80 to 79. Again, Kotdes appears in the Survey List, while it is absent in the other two lists, because it was transferred to Puri after the survey. The Survey List number would thus be reduced to 78. On the other hand, Kuhunda Jayapur is given as one pargana in the Survey List, a separate survey not having been made for each of the divisions as portions of one fell into the other. In the other two lists the two divisions are shown separately. This would bring up the survey number again to 79. To this have to be added the following eleven parganas which are shown in the Board of Revenue and *tauzi* lists, but not in the Survey List :—Aul Kila, Chhedra Kadalibari, Jayanabad, Shahabad, Shujabad, Shujanagar, Sultanabad, Mutri, Patumahanadi, Manjuri, and Sukinda. The number in the Survey List would now be 79 + 11 = 90. This is the number shown by Dr. Hunter on page 223, as well as in the subjoined list. Explanations of the omission of the above in the Survey List on page 232 of Hunter will be given now :—

Aul Kila (the measured and settled portion), with an area of 1·8 square miles, is not shown separately in the Survey List, as, being a small tract in the larger estate of Aul Kila, it is included in the Survey of the latter.

Chheddra Kadalibari is not included for similar reasons.

Jayanabad, Shahabad, Shujabad, Shujanagar, and Sultanabad are not shown in the Survey List, as small portions of each of these parganas are scattered all over the district, instead of forming compact tracts.

Mutri is not given in the Survey List, as it was included in the Survey of Baharupa and Bakrabad.

Patumahanadi is a temporary mahál, a char raised in the river after the Survey. It is situated in Dompara.

Manjuri is not given in the Survey List. Most of the mahals of this pargana have been transferred to Balasore, only one small one being left in Cuttack.

Sukinda is not included in the Survey List of the district, having been most probably regarded as one of the Tributary Mahals.

Fiscal divisions of the district of Cuttack.

Number.	NAMES OF PARGANAS.	Number of estates.	Area in acres.			Government revenue.		
			A.	R.	P.	Rs.	A.	P.
1	Abartak	13	6,225	1	1	5,122	0	7
2	Ahiyas	161	21,306	0	14	13,587	0	4
3	Alti	41	50,682	2	16	26,594	7	11
4	Anabartak	1	2,686	0	12	563	1	8
5	Apila	1	3,363	1	35	1,954	11	0¾
6	Asureswar	82	44,091	0	15	30,453	13	1
7	Atkanta	3	3,851	2	6	1,464	8	1
8	Aul Kila	1	28,135	7	4	553	12	10½
9	Aul Kila (measured and settled portion) ...							
10	Bahurupa	1	1,059	2	35	534	11	8
11	Bakrabad	127	38,993	1	16	13,988	9	8
12	Balubisi	182	38,252	2	25	29,194	0	10½
13	Baran	56	17,103	0	20	5,380	0	7
14	Bardiyala	2	4,357	0	26	1,281	6	9
15	Bargaon	10	1,030	2	28	5,173	10	1
16	Barpalla	16	4,109	1	21	2,914	8	0¾
17	Baruya	142	32,019	1	31	22,112	11	7
18	Bautara	30	3,574	0	24	1,187	12	7
19	Bonahar	71	30,182	1	11	1,441	10	3½
20	Bishnupur Kila	1	11,201	1	25	1,856	0	3
21	Cuttack Havili	10	7,666	2	5	1,660	14	$0\frac{5}{12}$
22	Chauda Kolat	5	8,374	0	12	6,145	15	6
23	Chhedra Kila	2	5,356	2	37	22	15	7
24	Chhedra Kodalibari ...	1	26	1	0	11	0	11½
25	Dalijora	11	50,971	1	3	8,843	2	$0\frac{1}{12}$
26	Damarpur	10	10,935	2	11	7,499	2	4
27	Darpan Kila	8	64,580	2	5	7,309	12	5
28	Doogaon	90	32,595	1	12	17,292	13	8½
29	Dorabisi	2	32,546	3	24	19	9	11
30	Dihi Arakpur	2	3,064	2	22	3,623	2	6
31	Dolgaon	165	28,155	0	0	12,080	1	8
32	Dompara Kila	1	56,558	2	6	1,333	5	4
33	Gandito	90	9,545	3	6	5,498	4	2½
34	Hariharpur	194	41,839	3	1	24,405	8	3
35	Harishpur Kila	161	39,421	0	0	24,957	0	0
36	Hatimunda	24	10,286	1	4	5,462	14	2
37	Jajpur	381	44,924	1	4	28,712	15	9
38	Jayanabad	1	5,208	0	0	2,701	2	4
39	Jaypur	44	12,871	0	0	8,757	12	8
40	Jhankar	25	36,391	1	20	25,503	7	6
41	Jodh	21	9,659	3	13	6,156	1	10
42	Kalamatiya	57	28,221	3	16	13,109	7	1½
43	Kalkala Kila	1	11,238	0	0	131	3	7
44	Kanchikhand	2	2,973	2	9	1,642	16	9
45	Kanika Kila	1	369,661	0	0	20,407	13	4
46	Karimul	62	17,791	0	25	8,402	10	6
47	Kate	62	43,745	1	1	16,384	13	11
	Kate Kutmul	12	......			1,017	9	7
48	Katiya	122	17,132	0	0	10,001	14	2
49	Kayama	59	4,143	0	3	4,884	9	5
50	Keruyal Khand	19	6,150	3	6	4,461	4	4
51	Khandi	47	19,385	3	39	14,877	11	9½
	Khandi Kutmul	14	......			3,979	9	0½
52	Kodinda	101	24,469	0	35	14,079	12	2
53	Koknya Khand	101	18,736	1	39	12,757	0	10½
54	Kubunda	12	754	0	0	1,440	13	3
55	Kujang Kila	1	229,366	0	1	22,407	13	4
56	Kurniya	13	4,846	1	27	2,383	0	6
	Kurniya Kutmul	6	......			378	2	3
57	Kuomandal	6	6,353	3	18	5,502	8	3
58	Kutabshahi	1	269	3	0	131	11	1
59	Modhupur Kila	1	36,773	0	0	6,174	14	1
60	Manjuri	1	6,846	0	0	3	8	7
61	Matkadabad	94	9,743	3	7	4,002	6	5½
62	Matkadnagar	105	21,794	2	23	15,970	3	6
63	Mutri	1	9,165	0	0	1,079	9	5½
64	Neulbisi	3	2,640	1	13	1,192	7	7
65	Nohakhand	9	11,088	1	39	8,649	4	2

Number.	NAMES OF PARGANAS.	Number of estates.	Area in acres.			Government revenue.		
			A.	R.	P.	Rs.	A.	P.
66	Olash	141	26,603	0	30	12,147	8	7
67	Padampur	46	15,940	2	28	12,129	2	9
68	Paena	7	6,669	0	28	4,195	13	11
69	Paenda	60	24,877	0	0	12,963	6	0 5/12
70	Panikhand	1	2,316	2	35	637	11	5
71	Patiya Kila	1	27,013	0	0	Lákhiraj.		
72	Patu Mahanadi	1	8	0	0	2	8	9
73	Sahibnagar	49	4,122	3	19	2,232	14	11½
74	Saibir	3	21,477	0	35	17,131	8	4
75	Sailo	116	26,388	2	28	10,144	7	0¼
	Sailo Kutmul	26	……			1,878	12	5⅓
76	Swaraswati	17	7,101	0	2	5,298	13	5⅓
77	Shahabad	5	2,124	0	0	1,076	14	10⅓
78	Shergarha	146	87,478	3	30	18,253	6	0⅓
79	Shujabad	4	2,797	0	0	1,207	0	8
80	Shujanagar	19	11,069	0	0	4,353	6	4½
81	Suhang	55	12,067	0	3	7,052	6	5½
82	Sukinda	1	10,240	0	0	1,364	5	5
83	Suknai	78	12,067	0	3	15,024	2	9
84	Sultanabad	9	3,363	0	0	1,248	2	10
85	Sungra	115	20,073	3	1	23,766	12	11
86	Tapankhand	9	8,505	2	3	2,765	11	0 1/12
87	Tisaniya	218	20,983	0	0	10,461	14	3½
88	Tikan	18	36,068	1	33	14,483	10	7
89	Tiran	13	28,048	0	0	18,859	10	10⅓
90	Utikan	8	43,673	0	17	26,959	3	7⅓

The names of the parganas in the foregoing list, the number of estates, and the Government revenue, have been taken from the *tauzi* registers, and the areas from the Survey map.

As the areas have been taken from the Survey map, they agree for the most part with those given on page 232 of Dr. Hunter's report. The two lists in Dr. Hunter's book, however, do not agree in their areas. The small differences to be observed may be explained by the fact that in the Settlement List the areas are taken from *padika* measurements, whereas in the other they are taken from measurements made with the chain. Further, the areas measured by the survey for a certain pargana are included among the areas of a different pargana in the Settlement List. This would seem to account for the larger differences.

A map is attached (showing the parganas) which was traced from a district map found by me in the Collectorate. The highest number in the map is 67. If to this be added the following which are shown in the map but not numbered, *viz.*, Kila Aul, Bishunpur Kila, Darpan Kila, Dompara Kila, Harishpur Kila, Kamka Kila, Kujang Kila, Madhupur Kila, and Sukinda Kila, the number of fiscal divisions would be raised to 76. Ragri, Kantajur, Balarampur, and Chowsatiparah, though shown in the map, are not numbered as they are all included in pargana Shergarah.

The settled portion of Kila Aul, Chhedra Kadalibari, and Kutubshahi being small areas, are included in the Survey of other parganas, and are not shown in the map. If they be included, the number will be brought up to 79.

Kuhunda-Jaypur, again, is shown as one pargana, though in the Settlement the parganas appear separately. The number of parganas for the map is thus raised to 80. On the other hand, in the map, Kila Kayama and Kismat Kayama are numbered separately though not shown in the *tauzi* register and in the Settlement List on page 223 of Dr. Hunter's report. The number will thus be again reduced to 79. To this has to be added the following eleven divisions, which have been omitted in the map:—Manjuri, Sahibnagar, Jayanabad, Shahabad, Shujabad, Shujanagar, Sultanabad, Patumahánadi, Matkatabad, Mutri, and Panikhand.

This would bring up the number to 90, as shown in the list of fiscal divisions which has preceded. Reasons for the omission of Manjuri, Mutri, Patumahanadi, Jayanabad, Shahabad, Shujabad, Shujanagar, and Sultanabad have been already given.

The whole of Panikhand is really a fishery under water, and so is not shown in the map. Portions of Matkatabad and Sahibnagar may have been shown in the map, but as most of the *mauzas* are very small and scattered all over the district, they, like Jayanabad, have been omitted altogether from the map.

APPENDIX II.

METEOROLOGICAL STATISTICS.

Statement showing the Rainfall at Cuttack for the years 1848 *to* 1891.

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1848	?	?	?	?	?	1·33	12·37	8·90	7·02	7·14	0·10	0·02	?
1849	1·02	...	0·10	0·03	1·60	11·15	12·90	8 85	4·95	4·10	0·80	7 60	53·10
1850		0·15	0·25	3·20	0·65	10 00	13 77	7·32	6·42	5·67	0·32	. .	47·75
1851	0·10	0·30	0·20	1·62	0·58	5·46	9·60	11·28	6·72	8·17	1·35	...	45·46
1852	...	...	...	...	...	...	...	...	...	...	...	...	71·90
1853	...	...	...	...	...	...	...	...	...	...	...	...	30·45
1854	...	...	...	...	...	...	...	. .	...	...	...	...	73·45
1855	...	...	...	...	...	...	..	...	...	...	...	...	60·85
1856	0·7	0·6	0·2	0·7	3·1	6·0	15·7	12·2	15·6	4·6	3·8	...	63·2
1857	...	...	1·1	0·4	0·5	9·6	4·9	7·0	12·0	9·1	...	...	44·6
1858	...	...	0·2	0·8	4·2	4·0	12·7	8·1	9·6	...	...	...	39·3
1859	...	...	...	3·2		9·6	4·9		3·2	5·5	...	0·9	27·3
1860	. .	...	...	.	1·0	7 2	7·4	15·1	12·5	0·7	...	...	43·9
1861	3·0	...	3·06	...	4 0	9·0	8·6	23·3	15·6	4·56	2·57	...	74·23
1862	0·8	..	.	. .	1·7	10·2	7·9	17·1	12·0	11·0	...	...	60·70
1863	...	1·3	0·8	1·5	1·6	19·8	20·8	19·6	10·4	2·5	2·5	...	80·8
1864	...	1·7	3·0	...	2 0	2 3	10·0	10·8	13·6	5·5	3·9	...	25·8
1865	1·10	2·30	3·60	0·70	5·26	10·23	12·33	8·08	7·44	1·47		0·50	52·91
1866	0·78	1·17	...	4·16	2·30	7 05	8 90	22·00	14·80	11·00	1·85	...	75·51
1867	0·10	0·30	1·30	2·30	7·80	18·70	10·83	9·51	10·11	5·40	0·35	...	66·70
1868	0·10	0·05	0·10	1·40	3 28	17·13	12·12	8·02	9·80	1·96	...	...	52·81
1869	0·40	1·37	1·74	1·65	0·85	6·75	15·04	8·76	9·23	5·35	.	...	48·14
1870	1·05	...	0·90	1·22	1·85	7·42	7·83	10·01	8·80	8·61	2·73	...	49·92
1871	...	0·56	0·43	5·77	4·20	7·44	15·32	5·93	9·67	0·91	...	0·16	50·39
1872	...	0·03	...	0·05	2·38	17·73	12·72	9·54	8·76	10·16	2·30	0·20	71·16
1873	...	. .	2·71	1·06	1·12	2·54	11·59	9 45	7·33	1·50	0·30	0·41	38·61
1874	1·82	2·23	0·08	0·42	3·06	17·22	16·41	19·81	11·31	11·53	2·20	0·05	86·74
1875	0·93	0·10	0·55	1·09	3·27	15·51	31·72	7 34	19·26	10·25	...	...	91·02
1876	. .	...	0·05	0·20	2·88	4·63	9·49	7·20	11·22	4·85	0·07	...	40·59
1877	1·04	1·72	0·86	8·69	6 05	6·34	9·36	5·23	6·10	3 38	0·03	...	43·80
1878	...	0·16	0·46	0·84	5·06	8·18	9·85	13·53	6·73	8 48	2·96	0·41	56·06
1879	...	0·07	1·39	0·00	8·09	2·55	...		..	...	...	...	
1880	0·04	2 08	...	1·32	6·68	8·01	10·93	21·18	10·29	5·17	1·36	...	67·06
1881	..		2·20	·95	1·23	16 04	14·03	10·05	11·27	2·83	0·51	0·18	50·69
1882	0·06	0·57	0·03	1·33	5·03	6·79	24·57	14·71	11·86	7·64	2·77	.	75·96
1883	.	0·18	1·26	0·08	4·96	23·09	14·32	8·61	12·93	0·55	0·30	0 96	67·24
1884	0·03	0·72	2·10	3·52	1·97	17·83	9·90	11·82	8·68	2·40	.	0·45	59·69
1885	.	3·40	1·06	1·91	5·74	3·08	11·64	6·90	8·33	2·60	1·47	1·01	47·74
1886	0 34	0·35	5·06	.	5·44	20·02	11·03	8·63	14·09	11·77	1·09	0 48	79·70
1887	1·76	...	1·88	0·90	8·20	15·23	10·70	10·56	7·14	1·29	0·25	...	52·86
1888	0·84	·64	2·13	...	2·80	1·12	8·44	25 41	9·85	1·41	2·81	...	55·45
1889	...	0·33	0·03	...	3·29	18·34	12·73	14·59	5·59	9·84	11·49	...	76·23
1890	. .	...	2·40	...	4·44	12·34	21·80	14 03	20·59	8·61	2·04	...	86·55
1891	...	0·60	5·62	...	5·07	3 72	10 59	21·09	30·95	1·83	4·87	...	85·84

The returns for the years 1848 to 1851 and from 1880 to 1891 have been taken from Indian Meteorological Memoirs, and those for the years 1852 to 1879 have been obtained from Revenue Reports of the Irrigation Department, Bengal.

Statement showing the monthly rainfall at five stations in the Cuttack district for the year 1891.

District.	Station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Cuttack ...	Jagatsingpur	0·35	0·02	0·81	0·68	2·90	7·23	11·03	10·12	8·50	6·80	1·16	0·39	50·68
	Banki	0·22	0·65	1·28	0·39	2·09	10·28	11·70	10·71	8·84	4·41	2·00	0·76	53·42
	Cuttack	0·34	0·71	1·27	1·38	4·20	11·52	13·38	11·08	10·07	5·63	1·13	0·30	61·05
	Kendrapara	0·42	0·73	0·87	1·06	3 91	8·87	12 27	12·56	9·37	6·26	0·86	0·48	57 66
	Jajpur	0·42	1·25	1·13	1·81	4·40	9·88	13·12	10·70	9·87	5·07	0·68	0·71	59·13
	Total ...	1·75	3 96	5 36	5·32	17·68	47·78	61·57	55·17	46·65	28·17	5·83	2·70	281·94
	Average ...	·35	·79	1·07	1·06	3·53	9·55	12·31	11·03	9·33	5·63	1·16	·54	56·38

The above stations are distributed uniformly over the district, so that the average may be fairly accepted as representative of the district.

Table of Temperature at 8 a.m. recorded at Cuttack for the year 1890.

Date.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1	61·9	57·9	76·0	82·0	80·6	87·1	79·8	88·0	85·0	82·0	77·0	64·1
2	60·9	58·9	76·0	83·0	86·1	85·1	82·0	83·5	84·0	82·0	76·0	63·9
3	59·9	59·9	74·0	82·5	89·1	88·1	82·5	84·0	85·0	83·5	76·0	65·9
4	58·9	61·9	73·0	83·5	88·1	88·6	86·1	83·5	84·0	84·5	76·5	66·5
5	64·9	64·9	76·5	82·0	88·6	89·1	83·5	87·0	85·0	82·0	76·0	65·4
6	62·9	72·0	76·0	84·0	89·1	88·1	82·0	83·5	83·0	82·0	74·5	65·9
7	62·9	67·9	73·0	84·0	86·1	84·0	78·0	81·0	84·0	83·5	77·0	66·9
8	62·9	68·9	77·0	84·0	88·1	86·1	78·0	83·0	84 0	83·0	78·0	67·4
9	61·9	70·4	76·5	84·0	90·1	87·1	81·0	82·5	85·0	84·0	78·0	69·9
10	62·9	69·9	75·5	83 0	89·1	83·0	80·0	88·0	85·0	82·0	78·0	71·0
11	61·9	68·9	78 0	84·0	89·1	87·1	79·0	81·5	83·0	81·0	73·5	72·0
12	62·9	66·9	79·0	84·5	88·1	87·1	81·0	80·0	85·0	77·0	68·9	72·5
13	61·9	67·9	78·0	83·5	88·1	87·1	83·0	82·0	82·0	78·0	69·4	72·0
14	62·9	68·9	77·5	83·5	82·0	87·5	82·0	83·0	82·0	79·0	68·0	72·0
15	65·9	66·9	77·0	84·5	79·0	83·0	84·0	82·5	80·0	81·0	69·9	71·5
16	63·9	68·9	76·0	85·0	85·5	84·0	83·5	84·5	81·6	79·5	68·9	71·9
17	62·9	72·0	81·0	82·0	84·0	85·5	85·0	84·0	82·0	77·0	66·9	68·9
18	63·9	73·0	81·0	83·0	87·1	84·5	87·6	84·0	83·0	78·0	64·9	71·0
19	63·9	70·4	81·0	85·5	87·1	83·5	83·0	83·0	88·0	77·0	64·9	71·0
20	66·4	75·0	80·0	86·1	88·6	84·0	80·0	81·0	82·5	78·0	66·9	71·0
21	64·9	73·0	80·5	86·6	88·1	80·0	82·5	80·5	83·0	79·0	67·9	72·0
22	64·9	71·0	80·5	87·1	89·1	83·0	83·0	78·0	81·0	76·0	68·9	70·4
23	64·9	69·9	81·0	87·0	86·0	83·0	82·0	80·0	81·0	76·0	67·9	72·0
24	69·4	71·0	82·8	87·1	86·1	87·0	79·0	80·0	77·0	70·0	66·9	67·9
25	72·0	76·5	81·0	88·1	87·1	84·0	81·0	82·0	78·0	79·5	64·9	63·9
26	62·9	75·0	83·0	83·5	88·1	84·0	83·0	83·0	79·0	78·0	62·9	63·9
27	58·9	74·5	82·0	79·0	88·6	83·5	81·0	78·5	82·0	77·0	64·9	65·4
28	55·9	76·0	82·0	83·0	83·5	81·5	81·0	83·0	81·0	76·0	64·9	64·4
29	56·9	...	82·0	85·0	85·0	82·0	79·5	81·0	80·0	78·0	64·9	62·9
30	55·9	...	80·5	88·1	90·0	78·5	78·0	80·0	81·5	79·0	63·9	59·9
31	55·9	...	83·0	...	83·0	...	80·5	83·0	...	77·0	...	60·4

Table of Barometric Pressure at 8 a.m. recorded at Cuttack for the year 1890.

Date.	January.	February.	March	April.	May.	June.	July.	August.	September.	October.	November.	December.
1	29·895	30·63	29·873	29·773	29·602	29·560	29·376	29·560	29·680	29·840	29·889	29·923
2	29·916	30·090	29·903	29·791	29·651	29·608	·458	29·582	·706	·832	·860	·949
3	29 967	30·067	29·972	29·797	29·579	29·658	·739	·581	·608	·792	·886	30·805
4	29·941	29·993	29·956	29·829	·642	29·613	·641	·592	·670	29·757	·948	·031
5	29·943	29·987	29·935	29·823	·678	29·527	29·613	·573	·650	·734	·966	·983
6	30·012	30·017	29·939	29·851	·596	29·495	·540	·551	29·616	·781	·941	29·955
7	30·0117	29·983	29·911	29·892	·502	29·530	·520	·551	·615	·787	·929	29·971
8	29·985	29·993	29·873	29·880	·515	·526	·562	·592	·619	·781	29·979	·984
9	29·993	30·019	29·887	29·884	·548	·525	·538	29·555	·638	·755	29·998	·977
10	29·976	30·021	29 877	29·820	29·606	·582	·511	·617	·636	·753	29·941	·958
11	29·949	30·021	29·803	29·748	·644	·600	·527	·593	·641	29·706	29·956	·905
12	29·950	30·004	29·787	29·767	·668	·634	29·538	·573	·656	·708	29·987	·965
13	29·970	29·904	29·762	29·790	·709	·596	·519	·568	29·608	·676	29·947	29·931
14	29·941	29·889	29·756	29·717	·766	29·559	·562	·553	·609	·626	29·973	·920
15	29·965	29·833	29·720	29·724	·756	29·505	·569	·604	·524	·696	29·969	·027
16	29·992	29·768	29 762	29·738	·650	·505	·553	29·624	·581	·856	29·989	·023
17	29·993	29·730	29·736	29·689	29·670	·489	·460	·608	·718	·923	30·013	·025
18	30·017	29·847	29 771	29·680	·657	·420	·431	·585	·710	29·852	·029	·012
19	29·915	29·908	29·811	29 748	·667	·318	29·420	·576	·690	·829	·017	·048
20	29·845	29·909	29·798	29·775	·694	·401	·420	·621	29·661	·884	·030	30·044
21	29 917	29·913	29·748	29·690	·638	29·558	·407	·648	·604	·915	·051	30·021
22	29·918	29·898	29·730	29·656	·642	·545	·411	·669	·604	·815	30·068	29·979
23	29·869	29·913	29·707	29·647	·650	·463	·473	29·685	·641	·901	·100	30·035
24	29 795	29·916	29·722	29·608	29·628	·519	·555	·679	·722	·894	·077	·120
25	29·837	29·915	29·699	29·570	·568	·622	·546	·664	·648	29·929	·052	·088
26	29·918	29·833	29·700	29·708	·570	·624	29·523	·676	·622	·919	·027	·019
27	29·916	29·876	29·736	29·829	·582	·586	·591	·674	29·630	·927	·023	29·983
28	29·943	29·908	29·761	29·745	·540	29·527	·627	·670	·700	·955	·029	30·055
29	30·033	...	29·773	·690	·528	·482	·586	·676	·759	·910	30·046	·016
30	30·022	...	29·777	·704	·562	·444	·526	29·674	·807	·890	·013	·035
31	30·045	...	29·779	...	29·530	...	·546	·645	...	·903	...	·023

Table of Wind directions at 8 a.m. recorded at Cuttack for the year 1890.

Date.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1	Calm	Calm	S.	S.E.	S.S.W.	S.E.	N.N W.	W.	W.S.W.	N N.E.	N.E.	Calm
2	Calm	W.N.W.	N.E.	Calm	S.S.W.	E.	S.E.	S.	Calm	S.S.W.	E.N.E.	Calm
3	Calm	Calm	Calm	Calm	S.S.W.	S.	S.W.	S.E.	W.	S.W.	E.N.E.	Calm
4	Calm	Calm	Calm	S.	S.W.	S.W.	W.	E.	Calm	S S.W.	E.N.E.	Calm
5	Calm	Calm	S S.W.	W.S.W.	W.S.W.	S.W.	Calm	E.	Calm	S.W.	N.E.	Calm
6	W.	Calm	Calm	S.	S.S.W.	S W.	W.S W.	E.S.E.	Calm	Calm	N.E.	Calm
7	W.	Calm	W.N.W.	S.W.	S.W.	S.S W.	S.W.	Calm	N.	Calm	Calm.	Calm
8	Calm	Calm	S.W	S.W.	S S.W.	S S.W.	S W.	S.W.	Calm	Calm	Calm	Calm
9	W.S.W.	Calm	Calm	S.W.	S.W.	S.W.	W.	W.S.W.	N.	N.N.E.	Calm	Calm
10	Calm	Calm	Calm	S.S.W.	S.W.	Calm	S W.	W.S.W.	Calm	N.N.E.	N.E.	Calm
11	Calm	Calm	Calm	S.W.	S.W.	S.W.	S.W.	S.W.	Calm	N E.	Calm	Calm
12	Calm	Calm	Calm	S.W.	S.W.	S.W.	W.S.W.	W.S.W.	E.	N E.	W.	E.N.E.
13	Calm	Calm	W.	S S.W.	S.W.	W S.W.	S.W.	W.S W.	Calm	S.E.	Calm	Calm
14	W.S.W.	Calm	W S.W.	S.W	Calm	Calm	Calm	W.N W.	E.	S.W.	Calm	E.N.E.
15	Calm	Calm	S.W.	S.S.W.	Calm	E.	W.S.W.	Calm	W.	S.W.	W.S.W.	N.N.E.
16	Calm	Calm	W.S.W.	N.N.E.	S.W.	Calm	W.S.W.	S.	E.	N.E.	Calm	Calm
17	Calm	S.W.	S.W.	S S W.	S.	Calm	W.S.W.	E.	E.N.E.	Calm	Calm	Calm
18	W.	E.N.E.	S.W.	W.S.W.	S W.	E.N.E.	W.	S.W.	E.	Calm	Calm	Calm
19	W.N.W.	Calm	S.	S S.W.	S.W.	E.	N.W.	Calm	Calm	W.S.W.	W S.W.	Calm
20	S W.	Calm	W.S.W.	S.W.	Calm	S.W.	W.	S.W.	S S.E.	N.W.	Calm	E.N.E.
21	Calm	Calm	W S.W.	S.W.	S.S.W.	W.S.W.	S.W.	Calm	N.E.	Calm	Calm	E.
22	Calm	Calm	Calm	S.S.W.	S.W.	W.S.W.	W.	W.S.W.	N.E.	W.	Calm	Calm
23	E.	S.	Calm	S.W.	S.S.W.	S.W.	S.W.	S.W.	E.N E.	W.S.W.	S.W.	N.N.E.
24	Calm	Calm	Calm	S.W.	S S.W.	S.W.	S.W.	W.S.W.	S.E.	N.N W.	Calm	N.E.
25	E.N.W.	Calm	S.W.	S.W.	S.W.	S.W.	W.S.W.	S.W.	E.	E N E.	Calm	Calm
26	Calm	S.S.W.	W.S.W.	N.E.	S.	S S.W.	S.W.	S.W.	S.W.	N.E.	W.S.W.	Calm
27	N.W.	S.W.	Calm	N.W.	S.	Calm	W.	W.S W.	S.S.W.	Calm	Calm	W.
28	W.	Calm	Calm	S W.	S.E.	W.N.W.	S.S.W.	W.S.W.	S S.W.	N.N.E.	Calm	Calm
29	Calm	...	S.	S.W.	N.N.E.	N.W.	S.W.	W.S.W.	Calm	Calm	Calm	Calm
30	N.N.W.	...	Calm	S.S.W.	S.S E.	W.N.W.	W.S.W.	W.S.W.	Calm	E.N.E.	Calm	Calm
31	W.N.W.	...	Calm	...	W.	...	S.W.	S.W.	...	Calm	...	Calm

Table of Cloud proportion at 8 a.m. recorded at Cuttack for the year 1890.

Date.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1	0	0	0	6	8	7	10	6	5	7	7	4
2	0	0	2	0	6	2	7	8	6	2	9	8
3	0	0	6	0	2	5	6	6	5	2	5	4
4	0	0	5	2	5	2	5	7	4	2	2	5
5	0	10	3	8	4	5	10	5	0	2	4	4
6	0	10	6	0	0	10	10	8	2	0	5	2
7	0	10	7	8	7	4	10	10	6	5	7	9
8	0	10	5	5	8	5	10	9	4	0	7	2
9	0	0	5	6	0	7	10	7	5	4	8	3
10	10	0	10	4	8	10	10	8	5	2	5	0
11	10	0	0	7	4	4	10	8	7	8	0	0
12	0	0	0	4	5	7	10	10	6	10	0	2
13	0	0	4	3	7	5	7	9	8	10	0	8
14	0	7	2	4	8	10	8	4	8	10	0	0
15	0	8	0	8	8	5	7	8	9	4	0	4
16	2	0	0	6	0	9	7	6	10	2	0	7
17	0	0	8	4	6	5	6	6	9	7	0	0
18	0	0	5	5	7	6	6	5	6	3	0	0
19	0	0	8	0	2	9	8	10	6	2	0	0
20	0	0	0	0	2	8	10	10	7	2	0	0
21	0	0	0	0	6	10	10	9	5	7	0	5
22	0	0	0	0	5	10	8	10	9	8	0	10
23	3	0	0	0	4	10	10	10	9	2	3	2
24	2	10	0	0	2	10	10	8	10	0	7	2
25	7	5	0	2	6	7	10	7	10	7	7	2
26	4	0	0	2	8	6	7	7	10	6	6	0
27	0	0	0	7	10	8	10	9	5	0	0	0
28	0	2	2	0	10	9	10	8	9	0	4	0
29	0	...	4	0	8	7	10	10	8	9	5	2
30	0	...	5	0	8	10	10	9	6	2	0	0
31	0	...	4	...	10	...	10	8	...	10	...	0

APPENDIX III.

POPULATION.

Population according to early records.—I have not been able to lay my hands on any records showing the population of Cuttack in former times. From the continual wars which raged throughout the last century, it would appear, however, very probable that, when the district came into the hands of the British Government, the population was very sparse. In volume XVIII of the Statistical Account of Bengal, Dr. Hunter gives a brief account of the attempts made in the early part of this century to form an enumeration of the population of the Cuttack district, from which it will be learnt that the first census was that taken about 1822 by Mr. Stirling, who estimated that Cuttack contained 440,784 persons. The next census was taken by the Revenue Survey in 1842, when the population was returned at 553,073 persons. The number of souls returned in the census taken after 1842 was 800,000. In 1847 the estimate stood at 1,018,979 souls, giving an average pressure, according to Dr. Hunter, of 320 persons per square mile. All these estimates were very rough, as the calculations were based simply on an enumeration of the houses, an average number of inhabitants being assigned to each house. In 1855 an attempt was made to get a correct average by counting the inhabitants also in different parts of the district, and the population was returned at 1,293,084 souls. About ten years after this, *i.e.*, after the famine of 1865-66, another census was taken, according to which the population was estimated at 1,072,463 persons. These, however, were only approximate estimates, and it was not till 1872 that the first reliable census of the district was taken. The lines on which the operations were conducted are given in the Census Report of 1872, and need not be reiterated here.

Population according to decennial censuses beginning with that of 1872.—In the year 1872, the total population consisted of 1,494,784 souls, with an average density of 470 persons per square mile. In 1881 it was found that the population had increased to 1,738,165, and that the pressure of the population on the area of the district amounted to 494 persons per square mile. According to the returns obtained by me from the Census Office for the present enumeration, the total number of persons amounts to 1,937,671, and the number of persons to each square mile is 533. There has been thus an increase of 20·08 per cent. in the population within the last twenty years, while the pressure on the land has also increased 13·4 per cent. within the same period. A portion of the increase in the population is due to the annexation of Banki, which, according to the present census, shows an area of 116 square miles, a total population of 57,368 souls, and a density of 495 persons per square mile.

Below are given three statements which show the population and area of the district, thána by thána, for the years 1872, 1881, and 1891—

Statement for 1872.

Subdivision.	Thána.	Area in square miles.	Number of towns and villages.	Number of houses.	Both sexes.	Males.	Females.	Persons per square mile.	Houses per square mile.	Persons per house.
Sadar ...	Cuttack ...	389	358	35,957	170,928	84,131	86,797	439	92	4·7
	Salipur ...	286	684	40,329	220,336	105,717	114,619	770	141	5·4
	Subdivisional Total...	675	1,042	76,286	391,264	189,848	201,416	579	113	5·1
Kendrapara ...	Kendrapara ...	294	558	31,085	159,234	77,958	81,276	541	105	5·1
	Patamundi ...	323	374	18,229	86,851	41 778	45,073	268	56	4·7
	Subdivisional Total...	617	932	49,314	246,085	119,736	126,349	398	79	4·9
Jajpur ...	Jajpur ...	273	581	34,472	189,475	89,368	100,107	694	126	5·5
	Dharmsala ...	446	993	43,229	223,069	108,212	114,857	500	96	5·1
	Ulabar ...	435	522	20,075	108,001	51,234	56,767	248	46	5·3
	Subdivisional Total...	1,154	2,096	97,776	520,545	248,814	271,731	451	84	5·3
Jagatsingpur...	Jagatsingpur ...	314	604	30,160	180,886	89,861	91,025	576	96	5·9
	Jagannathpur ...	418	826	27,894	156,004	77,071	78,933	373	66	5·5
	Subdivisional Total ...	732	1,430	58,054	336,890	166,932	169,958	460	79	5·8
	District Total ...	3,178	5,500	281,430	1,494,784	725,330	769,454	470	88	5·3

Statement for 1881.

Subdivision.	Thana.	Area in square miles.	Number of towns and villages.	Number of occupied houses.	Both sexes.	Males.	Females.	Number of persons per square mile.	Number of houses per square mile.	Number of persons per occupied house.
Sadar ...	Cuttack ...	389	993	40,538	198,574	98,665	99,909	510·47	123·45	4·90
	Salipur ...	286	2,216	47,400	249,979	120,383	129,596	874·05	179·88	5·27
	Jagatsingpur ...	314	1,243	38,190	215,002	106,294	108,708	684·72	136·61	5·63
	Total ...	989	4,452	126,128	663,555	325,342	338,213	670·94	143·95	5 26
Kendrapara .	Kendrapara ...	294	1,577	32,164	191,019	93,254	97,765	649·72	115·09	5·94
	Patamundi ...	323	674	18,264	109,401	54,127	55,274	338·70	58·95	5·99
	Tirtol .	419	1,557	33,935	183,677	90,923	92,754	438·37	92 82	5·41
	Aul or Rajabari	388	592	14,764	91,015	45,267	45,748	234·57	39·42	6·16
	Total ...	1,424	4,400	99,127	575,112	283,571	291,541	403·87	75·19	5·80
Jajpur ..	Jajpur ...	321	1,848	46,209	250,736	119,223	131,513	781·11	150·27	5·43
	Dharmsala ...	783	2,146	44,972	248,762	121,118	127,644	317·70	59·87	5·53
	Total ...	1,104	3,989	91,181	499,498	240,341	259,157	452·44	86·15	5·48
	District Total ...	3,517	12,841	316,436	1,738,165	849,254	888,911	494·22	97·96	5·49

Statement for 1891.

Subdivision.	Thana.	Area in square miles.	Number of towns and villages.	Number of occupied houses.	Both sexes.	Males.	Females.	Number of persons per square mile.	Number of houses per square mile.	Number of persons per occupied house.
Sadar ...	Cuttack ...	389	593	45,783	215,326	107,887	107,439	554	118	5
	Banki ...	116	128	11,840	57,368	28,628	28,740	495	102	5
	Salipur ...	286	686	54,420	270,568	128,326	142,242	946	190	5
	Tirtol ..	419	787	33,075	168,861	83,347	85,514	403	79	5
	Jagatsingpur ...	314	795	49,060	269,868	132,648	137,220	859	156	5
	Total ...	1,524	2,989	194,178	981,991	480,836	501,155	644	127	5
Kendrapara ...	Kendrapara ...	294	688	39,375	214,954	104,751	110,203	731	134	5
	Pattamundi ...	323	382	20,588	113 446	54,475	58,971	351	64	5
	Aul or Rajabari	388	344	18,970	101,370	49,737	51,633	261	49	5
	Total ..	1,005	1,414	78,933	429,770	208,963	220,807	428	78	5
Jajpur ...	Jajpur ...	321	623	49,065	258,400	121,237	137,163	805	153	5
	Dharmsala ...	783	403	55,813	267,510	129,521	137,989	342	71	5
	Total ...	1,104	1,026	104,878	525,910	250,758	275,152	476	95	5
	District Total ...	3,633	5,429	377,989	1,937,671	940,557	997,114	533	104	5

Persons engaged in agriculture.—According to the returns obtained by me from the Cuttack Collectorate of the present Census, I find that the total number of male adults is 562,116, and the total number of adult male agriculturists, including landholders, cultivators, and agricultural labourers, is 303,840. The total number of male children according to the same returns is 378,441. Knowing thus the proportion of male children to male adults, as well as the number of adult male agriculturists, the number of male children agriculturists may be found by the following calculation :—

$$\frac{303{,}840 \times 378{,}441}{562{,}116}.$$ The result gives 204,558 male children belonging to agriculturists.

Adding this to the number of adult male agriculturists, *i.e.* 303,840, the total number of male (*i.e.* adults and children) agriculturists amounts to 508,398.

Taking from the same returns 562,116 as the total number of male adults, and 623,993 as the total number of female adults, and according to the above calculation 508,398 as the total number of male agriculturists, the total number of female agriculturists (adults and children) may be found thus :

$$\frac{623{,}993 \times 508{,}398}{562{,}116} = 564{,}362.$$

The total number of agriculturists, according to the above, would thus be 508,398 + 564,362 = 1,072,760. The total population of the district amounting, according to the present Census, to 1,937,671, it will be seen that the agriculturists would form 55 per cent. of the total population. It must be remembered, however, that though this figure may represent the ratio of agriculturists in Cuttack, it does not convey a correct idea of the total number of persons engaged in agricultural pursuits. In Cuttack, there is scarcely a single caste that does not live by cultivation. Even some Brahmans, who may be interdicted from touching the plough themselves, employ labourers to till their lands. Boatmen, fishermen, washermen, barbers, shepherds, cowherds, potters, weavers, oilmen, palki-bearers, &c., all of them, while carrying on their respective caste avocations, cultivate their lands at the same time. From rough calculations I made in certain villages while touring in the district, *i.e.* by counting the total number of houses and the number of houses inhabited by agricultural families, then finding the percentage of the latter on the former, and taking the average of the results, and from what I have been able to gather from local reports, I do not think I would be far from the truth if I were to estimate the agricultural population at about 70 to 75 per cent. of the whole population.

Statement showing the distribution of the population of Cuttack according to education and religion.

	1881.								1891.							
	MALES.				FEMALES.				MALES.				FEMALES.			
	Under instruction.	NOT UNDER INSTRUCTION.		Total.*	Under instruction.	NOT UNDER INSTRUCTION.		Total.	Under instruction.	NOT UNDER INSTRUCTION.		Total.	Under instruction.	NOT UNDER INSTRUCTION.		Total.
		Can read and write.	Cannot read and write.			Can read and write.	Cannot read and write.			Can read and write.	Cannot read and write.			Can read and write.	Cannot read and write.	
Hindus	34,249	48,187	771,293	853,729	262	413	889,823	890,498	31,211	99,060	784,251	914,522	597	1,569	965,268	967,434
Muhammadans . ..	949	1,609	19,867	22,425	46	109	24,949	25,104	1,247	3,243	20,159	24,649	49	160	28,037	28,246
Christians	190	362	519	1,071	279	299	693	1,271	269	558	512	1,339	191	628	565	1,384
All others	3	9	465	477	...	...	490	490	...	9	38	47	...	...	50	50
All religions	35,391	50,167	792,144	877,702	587	821	915,955	917,363	32,727	102,870	804,960	940,557	837	2,357	993,920	997,114

From the statement given above it will be seen that the Hindus form the mass of the population, while the proportion of Muhammadans does not exceed 3 per cent. The number belonging to other religions is merely nominal.

Below is given a comparative table showing the percentage of the several religious divisions on the total population as shown by the three decennial censuses of the district. It will be noticed that in 1881 there was increase in the percentage among Hindus and Muhammadans as compared with that of 1872, and a decrease among Christians and people of other religions than that of the Hindus and Muhammadans. In 1891 as compared with 1881 there has been a slight increase in the percentage among Hindus, Muhammadans, and Christians, while the percentage of all other religions besides those has fallen off :—

Religions.	1872.	1881.	1891.
Hindus	95·66	97·09	97·12
Muhammadans	2·67	2·71	2·72
Christians	·15	·13	·14
All others	1·49	·05	·005

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* The figures for the years 1872 and 1881 have been obtained from the Census Report of 1881, while those for 1891 have been worked out by me from returns obtained from the Census office.

APPENDIX IV.

STATISTICS OF EMIGRATION AND IMMIGRATION.

Emigration with its proper and intended purpose of relieving the country of its surplus population is unknown in the district. The table given below will show what a very inconsiderable number of coolies is registered annually. Many coolies are recruited in the district of Ganjam and in the Gurjats and passed through Cuttack on their way to Calcutta, but no statistics whatever are available of this free emigration.

A very large number, however, go annually to Calcutta with the hope of returning enriched to their paternal homesteads. There are generally the able-bodied men, the majority of whom go out as day labourers and palki-bearers; some seek employment as domestic servants, as gardeners and attendants, and others find work in gas works and dockyards. The men who thus take service in Calcutta belong to a great variety of castes, being made up of—

(*a*) Brahmans, who are found as cooks in the *thakurbaris* of the Bengalis and Hindustanis;
(*b*) Gowallas, who form the majority of palanquin and domestic bearers;
(*c*) Khandaits, who serve as durwans;
(*d*) Gurias and banias, who are to be seen presiding over counters as *murimurki*, *chura* and *masala* vendors; and
(*e*) Bhendaris, who work in the gas companies.

The majority of these temporary emigrants return once a year if they can. Their savings, which vary from Rs. 30 to Rs. 100 per annum, are spent on their return home in marriages, in the payment of debts, and in the investment of new comforts and luxuries of life, such as better clothing and richer ornaments, and in a short time their pockets are quite empty, so that they are ready to start again for Calcutta to recoup themselves once more. A similar emigration takes place on a smaller scale to neighbouring districts, to the Gurjats, Central Provinces, and Midnapore.

Effects of temporary emigration.—This temporary emigration is greatly encouraged by the cheap fares from Alba and Chandbali. Latterly it has been observed that when labour is scarce at home during the non-cultivating season, many, induced by the cheap steamer fares, go off to Calcutta to find work, and thus the time which would have been whiled away idly is utilized profitably, so that the labourer comes home more than recompensed for his travelling charges. It may be interesting to note here the effect which this movement has on the social condition of the people. The most bigoted Urya of a high caste has to sit by, to drink water, and even take refreshments alongside, a lowborn sweeper, whose contact under other circumstances would be pollution. The tendency, therefore, is to break through prejudices and to bring about familiar connections previously unknown.

Statement showing the number of coolies registered for Assam and the Colonies.

NAME OF YEAR.	Number of emigrants.	REMARKS.
1872-73	..	A good many women, chiefly famine outcasts, were brought as emigrants, but it does not seem they were registered by the Magistrate.
1873-74	34	
1874-75	...	
1875-76	89	
1876-77	62	
1877-78	52	
1878-79	...	No coolies registered.
1879-80	27	
1880-81	133	
1881-82	176	
1882-83	155	
1883-84	84	
1884-85	3	
1885-86	...	No coolies registered.
1886-87	10	
1887-88	...	Ditto.
1888-89	...	Ditto.
1889-90	10	
1890-91	43	

The emigration is chiefly internal, as the coolies are recruited for the tea-gardens in Assam. A few, however, have been registered for Dutch Guiana. Many of the coolies so registered have been Telugus.

Immigration.—There is no immigration properly so-called in the district. The opening of the irrigation works brought in a large number of Madrasi Telugus into the district, who, accompanying their overseers and other employés from Madras, began to look out for manual labour in Cuttack, but this movement, like the emigration of the Uryas, was only temporary. Telugu labourers still come into the district from Madras to serve chiefly as day-labourers on the works carried on by the Public Works Department, and are now settling down with their families, but their number and the number of the Telugu shopkeepers in Cuttack town is very insignificant.

Marwaris visit Orissa for trade, but they are mere sojourners, returning periodically to their native land. A few Bengalis are to be seen. Some have set up as petty dealers, and others, coming in originally as clerks and land agents, have eventually settled down in different professions. A very small number who carry on the *pán cultivation* of the district and as small a number who are engaged in tusser silk-weaving have become thoroughly *Uryaized*, and cannot be distinguished in their talk and appearance from the natives of the place.

APPENDIX V.

AGRICULTURAL STATISTICS.

(1) *Areas of Cultivation.*—The best information available on this subject is that which has been submitted by the Collector of the district to the Director of Agriculture, Bengal, for the Statistical Returns to be published by the Agricultural Department for the year ending 31st March 1892. I accordingly quote below the figures given for those returns:—

Statement showing acreage and classification of area and the acreage under crops.

			Acres.
Acreage and classification of area ...	Area according to Survey Department ...		2,324,480*
	Not available for cultivation, culturable waste other than fallow, current fallows		1,062,480
	Nett area cropped during the year ...		1,262,372
† Acreage under crops ...	Cereals and pulses	Rice ...	1,089,681
		Other food-grains including pulses ...	248,500
	Oil-seeds ...	... ...	97,000
	Sugarcane ...	... ...	15,000
	Fibres ...	Cotton ...	4,000
	Miscellaneous	Food ...	49,000
		Non-food ...	...
	Total areas of crops cultivated ...		1,503,000
	Area cropped more than once ...		241,000
	Nett area cropped during the year ...		1,262,000

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* The total area of the district as given in the above statement is 3,632 square miles.

† The areas under crops as given above must be accepted as mere approximations. No estimates have been made of the areas under *Jute* and *Tobacco* which are known to be cultivated in the district. Accepting, however, the calculations given above, the proportion of cultivated to total area of the entire district would amount roughly to 50 per cent. This is the percentage of cultivated area in Banki, a Government Estate of the district, as given in the completion report of the Settlement of that estate.

APPENDIX VI.

RATES OF RENT.

(1) *Rates of Rent.—Vide* volume XVIII, Statistical Account of Bengal pages 139 to 146.

(2) *Abwabs.*—An abwab is an institution very old to the country. Very little can be done to abolish the system of payment of these cesses by the raiyat, and though their existence cannot be well justified on moral grounds, a little thought will show that under the present state of things it is wise for the raiyat to submit to this ancient custom. The whole well-being of the raiyat depends upon his being on good terms with the zamindar. Whether this illegal exaction is given to the latter directly or is paid to his *sarbarahkar*, it keeps him content and prevents his enhancing rents. The perquisites being given, everything runs smoothly ; otherwise ensues bitter feeling and quarrelling and litigation, through which the raiyat must invariably come out worse for all his trouble. An *abwab* has been well described by a former Collector of the district as " a sort of a peace-offering, probably to deprecate attempts to enhance rent and partly as feudal gifts." The Collector adds :—" There is no doubt that there is a good deal of the feudal feeling in Orissa, perhaps maintained by the existence of numerous *lakhiraj* and *jagir* tenures." The mischief, however, is that there runs in all such demands an element of extortion, which it is not always easy to prove, as the zamindar, if he is so inclined, has many ways of getting in his cess without actually transgressing the law. My own experience of the Cuttack district has shown that while there are many cesses which the raiyats cheerfully and voluntarily pay as relics of old customs or in some way connected with religious festivals, they certainly murmur against all extortionate demands on rent and holdings. The cesses vary in different localities in character and amount. While some are universal through the district, others are restricted only to certain parganas, and it might generally be stated that they are to a greater or less extent taken by all zamindars. The following gives the names and descriptions of some of the exactions, information about which has been obtained to some extent, and with some difficulty from raiyats, who are afraid of speaking openly on the subject lest they might get into trouble.

Names and description of abwabs.

(1) *Sunnya salami.—Sunnya* is the first day of the agricultural year. The *salami* has been paid on this day as a compliment to the zamindar from time immemorial, the custom always having been for the zamindar to march .to his cutcherry, and there hold a darbar which opens with certain religious ceremonies performed by the Brahmans. The raiyats attend with presents, either in money, varying from a few pice to a rupee, or in kind, consisting of vegetables and fruits or different kinds of manufactured articles, *e.g.*, carpenters give chairs, kamars knives, kumhars pots, telis oil, gowallas ghi. The ceremony means the recognition of the zamindar as zamindar by the raiyats, being performed at the time of the adjustment of accounts. Though in origin only a customary and voluntary New Year offering, it is in many cases now exacted as compulsory. The ceremony often closes with a nautch. As a rule, this customary cess is not objected to by the raiyats.

(2) *Dhusserah kharcha* is given in the form of money or in kind during the time of the Dhusserah Puja. The contribution is generally very nominal.

(3) *Baisakh sankranti kharcha.*—The reason for this contribution, I find from an old paper, is " that owing to the excessive heat at this time of the year, the worthy but *gharib* (poor) Brahmans must be given extra alms. Every estate accordingly contributes, and the zamindar comes in for some money as well as the Brahmans.

(4) *Bihatahina or Biachina* is a fee varying in amount from a rupee upwards, which is paid to the zamindar whenever there is a marriage in the raiyat's house. The parents of the bridegroom generally pay the amount. The father of the bride has also to pay sometimes, but the fee for a girl is generally less than that for a boy.

(5) *Mangala pancha* is a cess given on the occasion of a birth, death or marriage in the zamindar's house. Each raiyat contributes his share of money, corn or vegetables according to the amount of land he owns.

(6) *Hathi kharcha* is the amount given to go towards defraying the expenses of the purchase or keeping of elephants, and *ghora kharcha* similarly goes towards the expenditure incurred for the zamindar's horses.

(7) *Patta salami* is a present given to the zamindar at the time of the execution of a lease. The rate for the first lease varies from a few annas to two or three rupees. By tenants-at-will an annual present is given to the zamindars for the renewal of their leases which is known as *salami*.

(8) *Jamabesi* is an increase in the regular *jama* or rent, which the zamindar sometimes takes when he thinks that his lands are able to bear a higher burden.

(9) *Kharra jami* means a receipt for rent, being the fee paid to the *gumashta* when the receipt is given. The zamindar sometimes get a share out of this.

(10) *Tikkus* is an income-tax fee, which is levied by the zamindar to reimburse himself for the amount he has been assessed with.

(11) *Dak kharcha* is a fee levied to make up for the zamindari dák cess, taken at the rate of a few pies only.

(12) *Russad kharcha.*—This comes ultimately on the raiyats, as when the zamindar has to make arrangements for supplies for a whole camp, he in his turn calls upon the raiyats to pay for the same. This, however, has become a thing of the past.

(13) *Gust kharcha* is similar to *russad*, being the fee levied to meet the travelling expenses of the zamindar. Very often the cess instead of being paid in money is given in kind, consisting of offerings of vegetables and other supplies for the zamindar when he is on tour in his estate.

(14) *Piyada kharcha* is the fee paid by the raiyat for the zamindar's peon, especially when he goes out to call for rent. It varies from two or four to eight annas.

(15) *Amla kharcha* is a cess levied for the salaries of *amlas*.

(16) *Amin kharcha* is the fee levied for the expense of an *amin* in measuring the raiyats' holdings. Something like two pice per mán of land is taken for his services.

(17) *Magun* is a generic name for levies of different kinds, literally meaning aid given by the raiyats to the zamindar for the asking of the same.

(18) *Bethi or begar bethi* is an exaction in the shape of personal service, that is to say, the raiyat is forced to give one or two days' labour to the zamindar, either in working in his garden, or in cutting and fetching fuel, or in carrying loads, or thatching houses. For his trouble, he receives as a rule no remuneration, or, if he does get anything, it is much lower than the ordinary wages of a labourer.

(19) *Bidhabar.*—This is more a *social fine* than fee, being the amount paid by the father and mother of an illegitimate child for the services of the village barber and washerman.

(20) *Akl salami* is similarly a fine or fee paid for bad conduct.

(3) *Operation of the Rent Law.*

The following comparative table taken from the Administration Reports of Commissioners shows the institution of the different classes of suits under the Rent Law (Act X of 1859) in the Cuttack district:—

DESCRIPTION OF SUITS.	1880-81.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.	1888-89.	1889-90.
Suits to recover arrears of rent ...	1,290	1,425	1,524	1,468	1,585	1,672	1,391	1,612	1,630	1,216
Suits to establish or contest right to enhancement	5	2	3	1	2	...	...	2	...	...
Suits regarding illegal exaction, decrees, distraint, &c.	149	124	146	128	126	88	72	78	47	59
Suits relating to ejectment	53	28	20	26	82	54	58	82	63	88
Notices of enhancement and relinquishment	134	168	58	76	82	62	54	56	66	37
Miscellaneous applications, including those for deposit of rents	1,016	1,125	1,046	774	995	725	761	601	504	936
Execution cases	322	555	523	595	558	503	679	685	576	602
Appeals	61	76	49	62	73	142	78	70	46	55
Total ...	3,030	3,503	3,369	3,130	3,503	3,246	3,093	3,186	2,932	2,993

An examination of the different kinds of Rent suits given above, shows that the largest number of cases instituted are in connection with arrears of rent and deposits of rent. The number of suits for arrears of rent have evidently been fluctuating for the last ten years, varying according to the fluctuations in the price of food-grains. Whenever the commercial prosperity of the district has been flourishing, and there has been an increase in the price of food-grains, the raiyats have been better able to pay rents. When, on the other hand, rice has been selling at a low rate, the raiyat has not had enough to pay, and a suit is accordingly instituted against him. There has been no steady increase or decrease in these arrears, and it is therefore impossible to know from this, whether raiyats as a body are better able now to pay their rents than they were ten years ago.

The comparatively large number of deposits of rent, show that the raiyats have come to know their rights, and will not easily give in to the zamindar in his unjust demands. When therefore the rent is enhanced, a deposit is made by the raiyat at the former rate, and the zamindar has to undergo the expense and trouble of getting this deposit paid to him. Such a procedure acts as a check on zamindars demanding an enhancement of rent. The large decrease in the notices of enhancement and relinquishment point to a more cordial feeling between landlords and tenants; and the diminution in suits regarding illegal exaction, distraint, &c., most of which are distraint cases, combined with the fact that cesses and abwabs still prevail, go to show that many of these cesses are paid voluntarily by the raiyat, and that the zamindar at the same time is getting more moderate in his demands. These figures, perhaps, go to show that the feeling between the zamindar and raiyat is gradually becoming more amicable, but it does not at all prove the absence of rack renting and oppression noticed in my remarks on the indebtedness of the raiyat. While on the subject of the operation of the Rent Law, it may be mentioned, in passing, that when His Honor Sir Charles Elliott visited Cuttack in January 1891, he was presented with a memorial by the people of the district, in which objections were brought forward against the proposed introduction of the Bengal Tenancy Act into Orissa. In February of the same year the Board recommended to Government that only a portion of the Act should be extended to Orissa. The matter was taken under the consideration of Government, and the provisions and clauses of some chapters of the Act are now in force in the district.

APPENDIX VII.

The following is a classification of estates on the district revenue roll (compiled from the Land Revenue Reports of the Collector) :—

Year.	Permanently-settled estates.	Temporarily-settled estates.	Government estates.	Raiyatwari tracts.	Total.
1880-81 ...	23	3,808	5	...	3,836
1881-82 ...	23	3,814	5	...	3,842
1882-83 ...	23	3,835	5	...	3,863
1883-84 ...	23	3,855	5	...	3,883
1884-85 ...	23	3,885	5	...	3,913
1885-86 ...	23	3,886	5	...	3,914
1886-87 ...	23	3,887	5	...	3,915
1887-88 ...	23	3,898	5	...	3,926
1888-89 ...	23	3,930	5	...	3,958
1889-90 ...	23	4,028	5	...	4,056
1890-91 ...	23	4,069	6	...	4,098

APPENDIX VIII.

WAGES AND PRICES

(1) *Wages.*—The wages of different classes of agricultural labourers, and of ordinary village servants, as well as their earnings during weeding, harvesting, and other agricultural operations have already been given in Chapter II. In agricultural districts, it is very difficult to ascertain the changes in the wage rates, or the actual position of wage rates, as much depends on the amount or nature of the work done, or whether the work is done in out-of-the-way small villages, or in the neighbourhood of large towns. In former times, labour was principally paid in kind, and where this practice is still followed there does not seem to have been any great alterations in the rates. The real change has been in the greater prevalence at present of paying labour in money, and wherever money wages are given, it will be found that the rates have increased during the last thirty or forty years. Whereas forty years ago an ordinary day labourer used to get only 6 pice a day in the towns, the same man now gets 10 to 12 pice per diem. In 1850 smiths and carpenters earned 3 annas a day in towns. Now common carpenters and smiths will not work for less than 4 annas a day, and superior carpenters and smiths demand as much as 6 and 8 annas a day. Masons formerly received 6 pice a day, and now can earn from 2 to 3 annas per day. In the mufassal the rates are cheaper. On the whole, both from printed records and from the evidence of aged persons, it may be said that during the last forty years, the rates of wages have risen higher—a result brought about, to a great extent, by the extension of works in the Department of Public Works, and by the extension, too, of cultivation.

The following table is taken from an Administration Report of the district. It shows the wages of labour prevalent now in Cuttack:—

Class of labourers.		Daily wages.	
		As.	As.
Skilled labour—			
Superior mason	...		4
Common do.	...	2 to	3
Superior carpenter	...		8
Common do.	...	4 to	6
Superior blacksmith	...		6
Common do.	...		4
Superior artisan	..	8 to	12
Unskilled labour—			
Able-bodied cooly	...	3 to	4
Common cooly	...	2½ to	3
Woman ...	...	1¼ to	2
Boy ...	...	1½ to	2

The figures given above represent really the wages prevalent in Cuttack and the subdivisional head-quarters. In villages, the ordinary day labourer, as remarked in Chapter II, hardly earns more than 5 to 8 pice per day. Appended is a list showing the wages in ten different villages of the district, which will confirm what has been said above:—

Name of Village.		*Wages per day.*
Gobindpur	... ...	7 to 8 pice without food. 4 pice with food.
Singpur	... ...	6 to 8 pice without food.
Kalyanpur	... ...	8 pice without food. 4 pice with food.
Cherbatti	... ...	8 pice without food. 4 pice with food.
Talpatna	... ...	5 pice without food.
Rishipur	... ...	7 ,, ,,
Sisania	... ...	8 pice without food. 4 ,, with food.
Orogora	... ...	5 pice without food.
Masara	... ...	8 ,, ,,
Panapara	... ...	5 ,, ,,

(2) *Prices.*—The statement below, giving the prices of food-grains, firewood, and salt in Bengal for the years 1866 to 1878, month by month, is taken from a report compiled in the Statistical Department, Bengal. A second statement is appended showing the prices

similarly from 1886 to 1891. No monthly figures could be obtained by me from the Collectorate for the years 1879 to 1885, as the registers, I was informed, have been burnt:—

Statement I.

Month.	Quantities per rupee by the seer of 80 tolahs.								
	Wheat.	Barley.	Rice, best sort.	Rice, common.	Lesser millets, ragi or murwa and cheena.	Maize or Indian-corn.	Gram.	Fire-wood.	Salt.
	S. c.	S. c.	S. c.	S. c.	S. c.	S. c.	S. c.	S. c.	S. c.
1866.									
January	9 0	...	10 0	13 0	...	...	...	...	...
February	8 0	...	7 0	9 0	...	...	...	...	...
March	8 0	...	8 0	10 0	...	...	...	...	...
April	7 0	...	5 12	6 12	...	...	...	...	9 2
May	7 0	...	6 0	7 12	...	...	...	...	9 2
June	4 8	...	3 8	4 8	...	...	...	...	9 2
July	5 0	...	3 8	4 12	...	...	...	...	9 2
August	5 0	...	4 8	5 4	...	...	...	...	9 2
September	5 0	...	5 0	6 8	...	...	...	...	9 2
October	5 0	...	5 0	8 0	...	...	...	...	9 2
November	8 0	...	12 0	14 12	...	...	...	...	...
December	7 12	...	13 4	16 0	...	...	...	...	9 2
1867.									
January	8 0	...	10 0	12 0	...	...	...	...	9 2
February	12 0	...	12 0	13 4	...	...	...	...	9 2
March	13 2	...	12 0	13 12	...	...	...	...	9 2
April	11 13	...	12 0	14 2	...	...	...	...	9 2
May	10 8	...	9 14	11 13	...	...	...	...	7 2
June	11 13	...	7 14	9 14	...	...	...	...	7 2
July	...	...	...	...	...	...	...	...	7 2
August	10 8	...	15 12	17 1	...	...	...	...	8 0
September	10 8	...	18 12	19 11	...	...	...	...	9 2
October	15 0	...	16 4	18 12	...	...	...	...	9 2
November	17 1	...	15 12	19 11	...	...	...	...	9 2
December	15 12	...	17 1	31 8	...	...	...	...	9 2
1868.									
January	15 12	...	21 0	31 8	...	...	...	...	9 2
February	19 11	...	21 9	30 3	...	...	...	...	9 2
March	21 0	...	19 11	31 8	...	...	...	...	9 2
April	19 11	...	17 1	28 4	...	...	...	...	8 0
May	19 11	...	21 0	27 9	...	...	...	...	8 0
June	17 0	...	19 11	23 5	...	...	...	...	8 0
July	19 0	...	23 10	28 14	...	...	...	...	8 0
August	19 11	...	23 10	30 3	...	...	...	...	8 0
September	21 0	...	19 11	27 9	...	...	...	...	9 2
October	15 12	...	...	21 0	...	...	...	...	8 0
November	15 12	...	17 1	24 15	...	...	...	...	8 0
December	10 8	...	18 12	24 15	...	...	...	...	8 0
1869.									
January	8 8	...	23 10	27 9	...	...	...	...	8 0
February	9 3	...	28 10	27 9	...	...	...	...	8 0
March	10 8	...	24 15	27 14	...	...	...	...	8 0
April	11 12	...	26 4	29 2	...	...	...	...	8 0
May	10 8	...	21 12	33 10	...	...	...	...	...
June	8 9	...	19 11	22 5	...	...	...	...	8 0
July	7 14	...	14 7	21 0	...	...	...	...	8 0
August	7 3	...	17 0	21 0	...	...	...	...	8 0
September	5 14	...	13 2	14 7	...	...	...	...	8 0
October	6 4	...	15 12	22 5	...	...	...	...	7 2
November	7 0	...	18 0	36 0	...	...	...	...	7 2
December	8 0	...	17 0	32 0	...	...	...	...	8 0
1870.									
January	8 0	...	17 0	33 0	...	...	...	...	8 0
February	9 0	...	17 0	34 0	...	...	...	...	8 0
March	9 0	...	16 0	30 0	...	...	...	...	8 0
April	10 8	...	18 0	30 0	...	...	...	...	8 0
May	10 8	...	18 8	29 0	...	...	...	...	8 0
June	10 8	...	17 0	25 0	...	...	...	...	8 0
July	12 0	...	20 0	29 0	...	...	...	...	8 0
August	14 0	...	17 0	22 0	...	...	...	...	8 0
September	13 0	...	17 0	22 0	...	...	...	...	8 0
October	13 0	...	18 0	29 0	...	...	...	...	8 0
November	12 0	...	17 0	25 0	...	...	...	...	8 0
December	13 0	...	17 0	28 0	...	...	...	...	8 0

STATEMENT I—*continued.*

MONTH.	QUANTITIES PER RUPEE BY THE SEER OF 80 TOLAHS.								
	Wheat.	Barley.	Rice, best sort.	Rice, common.	Lesser millets, ragi or murwa and cheena.	Maize or Indian-corn.	Gram.	Fire-wood.	Salt.
1871.	S. c.	S. c.	S. c.	S. c.	S. c.	S. c.	S. c.	S. c.	S. c.
January ...	12 0	...	17 0	26 0	...	...	...	...	8 0
February ...	12 0	...	17 0	26 0	...	...	...	...	8 0
March ...	12 0	...	17 0	21 0	...	...	...	...	8 0
April ...	12 0	...	17 0	29 0	...	...	...	...	2 10
May ...	13 0	...	18 0	28 0	...	...	...	...	8 0
June ...	13 0	...	18 0	26 0	...	...	...	...	8 0
July ...	13 0	...	18 0	26 0	...	...	...	...	8 0
August ...	21 0	...	19 0	32 0	...	...	...	...	8 0
September ...	15 0	...	18 0	37 0	...	...	...	...	9 2
October ...	15 0	...	18 0	26 0	...	...	...	...	9 2
November ...	17 0	...	17 0	30 0	...	...	...	...	9 2
December ...	17 0	...	17 0	28 0	...	...	...	...	9 2
1872.									
January ...	18 0	...	17 0	32 0	...	...	...	...	9 2
February ...	18 0	...	18 0	32 0	...	...	...	...	9 2
March ...	...	...	...	...	...	...	...	...	9 2
April ...	17 0	...	23 10	30 2	...	...	31 0	...	9 0
May ...	15 12	...	22 0	28 2	...	...	27 8	...	9 0
June ...	15 12	...	21 0	25 8	...	...	27 8	...	9 0
July ...	15 12	...	14 6	17 5	...	...	20 10	...	7 14
August ...	15 12	...	15 13	21 0	...	...	16 13	...	7 14
September ...	15 12	...	15 2	20 6	...	...	18 6	...	8 0
October ...	18 6	...	21 0	38 1	...	...	26 4	...	8 0
November ...	15 12	...	19 11	34 2	...	...	22 5	...	8 9
December ...	15 12	...	21 0	34 2	...	...	24 15	...	8 8
1873.									
January ...	13 2	...	26 4	31 8	...	...	28 14	...	8 8
February ...	15 12	...	26 4	31 8	...	...	30 13	...	8 8
March ...	18 6	...	26 4	32 13	...	...	28 15	...	9 8
April ...	19 11	...	24 15	31 8	...	...	26 4	...	9 2
May ...	15 12	...	21 0	27 9	...	...	26 4	...	9 2
June ...	14 3	...	23 10	31 8	...	...	26 4	...	9 2
July ...	19 11	...	28 10	31 8	...	...	24 15	...	9 2
August ..	17 0	...	21 0	31 8	...	...	26 4	...	9 2
September ...	17 1	...	22 5	31 8	16 0	...	27 9	200 0	9 2
October ...	14 7	...	23 10	31 8	16 0	...	27 9	200 0	9 0
November ...	13 2	...	17 1	23 10	14 7	...	26 4	200 0	9 2
December ...	13 2	...	17 1	22 5	...	21 0	24 15	200 0	9 2
1874.									
January ...	13 2	...	21 0	26 4	21 0	...	26 4	200 0	9 2
February ...	15 12	...	22 5	27 9	21 0	...	28 14	200 0	9 2
March ...	15 12	...	19 11	28 14	14 7	...	28 14	200 0	8 8
April ...	17 1	...	19 11	27 9	17 1	...	27 9	200 0	9 0
May ...	13 2	...	19 11	26 4	17 1	...	27 9	200 0	9 0
June ...	11 13	...	17 1	23 10	17 1	...	24 4	200 0	10 10
July ...	14 7	...	18 6	26 4	17 1	...	25 1	200 0	9 0
August ...	15 12	...	18 6	26 4	17 1	...	22 5	200 0	10 8
September ...	17 1	...	18 6	22 15	21 0	...	23 10	200 0	10 10
October ...	17 1	...	17 1	24 15	21 0	...	22 5	200 0	10 10
November ...	18 6	...	18 6	26 4	21 0	...	21 5	200 0	10 10
December ...	18 6	...	18 6	28 14	21 0	...	21 0	200 0	10 10
1875.									
January ...	21 0	...	18 6	28 14	21 0	...	19 11	200 0	10 10
February ...	19 11	...	18 6	26 4	21 0	...	17 11	200 0	10 10
March ...	17 1	...	18 6	31 8	21 5	...	17 1	200 0	10 10
April ...	18 6	...	21 0	27 9	21 0	...	21 0	200 0	10 10
May ...	15 12	...	17 1	21 0	26 4	...	15 12	200 0	10 10
June ...	21 0	...	17 1	22 5	19 7	...	15 12	200 0	11 0
July ...	15 12	...	14 7	21 0	36 12	...	15 12	200 0	14 7
August ...	21 0	...	13 2	19 0	21 0	...	16 6	200 0	12 0
September ...	18 6	...	14 7	21 0	21 0	...	15 0	200 0	12 8
October ...	21 0	...	17 1	23 10	21 0	...	16 6	200 0	13 0
November ...	21 0	...	17 1	31 8	15 12	...	19 11	200 0	13 0
December ...	21 0	...	18 6	31 8	21 0	...	17 1	200 0	13 0

STATEMENT I.—*concluded.*

MONTH.	Wheat	Barley.	Rice, best sort.	Rice, common.	Lesser millets, ragi or murwa and cheena.	Maize or Indian-corn.	Gram.	Fire-wood.	Salt.
	QUANTITIES PER RUPEE BY THE SEER OF 80 TOLAHS. *								
	S. c.	S. c.	S. c.	S. c.	S. c.	S. c.	S. c	S. c.	S. c.
1876.									
January ...	21 0	...	18 6	31 8	21 0	...	30 3	200 0	13 0
February ...	22 5	...	19 11	23 14	17 1	...	27 9	200 0	13 0
March ...	21 0	...	17 1	28 14	21 0	...	28 14	200 [illegible]	13 0
April ...	22 5	...	17 1	28 14	26 4	...	30 3	200 0	13 0
May ...	21 0	...	18 6	26 4	21 0	...	26 4	200 0	13 0
June ...	21 0	...	17 1	24 15	21 0	...	26 4	200 0	13 0
July ...	21 0	...	15 12	22 5	21 0	...	23 10	200 0	13 0
August ...	21 0	...	15 12	19 11	21 0	...	24 15	200 0	13 0
September ...	26 4	...	18 6	22 5	26 4	...	26 4	200 0	13 0
October ...	23 10	...	18 6	24 15	19 11	...	27 9	200 0	13 0
November ...	21 0	...	17 1	21 0	18 6	...	22 5	200 0	13 0
December ...	17 1	...	17 1	19 11	21 0	...	19 11	200 0	13 0
1877.									
January ...	17 1	...	14 7	19 11	19 11	...	21 0	200 0	13 0
February ...	17 1	...	13 2	18 6	21 0	...	17 1	120 0	13 0
March ...	15 12	...	15 12	18 6	28 14	...	19 11	200 0	13 0
April ...	15 12	...	13 2	19 11	22 5	...	19 11	200 0	11 8
May ...	15 12	...	15 12	18 6	21 0	...	15 12	200 0	12 0
June ...	13 2	...	14 7	17 1	21 0	...	17 1	200 0	12 0
July ...	13 2	...	11 13	15 12	23 10	...	15 12	200 0	11 0
August ...	14 7	...	10 8	14 7	21 0	...	15 12	200 0	11 0
September ...	13 2	...	8 14	10 8	20 5	...	13 2	200 0	10 8
October ...	13 12	...	10 8	15 12	21 0	...	18 6	200 0	11 0
November ...	14 7	...	9 3	15 0	17 0	...	18 6	200 0	12 0
December ...	14 7	...	9 3	14 7	17 0	...	17 0	200 0	12 0
1878.									
January ...	8 8	...	9 3	13 2	14 7	...	17 8	200 0	10 0
February ...	10 8	...	9 3	13 2	10 8	...	17 1	200 0	11 0
March ...	10 8	...	9 3	11 13	21 0	...	15 12	200 0	11 0
April ...	10 8	...	8 0	13 2	21 0	...	15 12	200 0	11 0
May ...	9 3	...	7 14	11 13	10 8	...	15 12	200 0	11 0
June ...	9 13	...	8 0	13 2	10 8	...	15 1	200 0	11 0
July ...	7 14	...	7 14	11 2	18 6	...	13 12	200 0	11 0
August ...	9 3	...	9 3	13 12	7 14	...	15 12	200 0	11 0
September ...	9 13	...	9 3	13 12	13 2	...	14 7	200 0	11 0
October ...	11 13	...	9 3	14 7	...	...	14 7	200 0	12 0
November ...	11 13	...	9 3	14 1	10 8	...	15 12	200 0	11 0
December ...	12 7	...	10 8	14 7	21 0	...	13 2	200 0	11 0

STATEMENT II.

1886.									
January ...	17 1	...	10 8	18 6	...	...	19 11	80 0	14 0
February ...	15 12	...	10 8	15 12	...	...	19 11	80 0	14 0
March ...	15 12	...	10 8	15 12	...	...	19 11	80 0	14 0
April ...	19 11	...	10 8	17 1	...	...	19 11	80 0	14 0
May ...	19 11	...	10 8	17 1	...	...	19 11	80 0	14 0
June ...	14 7	...	10 8	17 1	...	...	17 1	80 0	14 0
July ...	17 1	...	10 8	15 12	...	...	17 1	80 0	14 0
August ...	17 1	...	10 8	15 12	...	...	18 6	80 0	14 0
September ...	17 1	...	10 8	15 12	...	...	18 6	80 0	14 0
October ...	17 1	...	10 8	18 6	...	...	18 6	80 0	14 0
November ...	14 7	...	10 8	18 6	...	...	18 6	80 0	14 0
December ...	13 2	...	13 2	18 6	...	...	18 6	80 0	14 0

STATEMENT II—*concluded.*

MONTH.	QUANTITIES PER RUPEE BY THE SEER OF 80 TOLÁHS.								
	Wheat.	Barley.	Rice, best sort.	Rice, common.	Lesser millets, ragi or murwa and cheena.	Maize or Indian-corn.	Gram.	Fire-wood.	Salt.
1887.	S. c.	S. c.	S. c.	S. c.	S. c.	S. c.	S. c.	S. c.	S. c.
January ...	11 13	...	11 13	21 0	...	...	17 1	80 0	14 0
February ...	13 2	...	10 8	18 6	...	...	17 1	80 0	14 0
March ...	14 7	...	13 2	18 6	...	...	17 1	80 0	14 0
April ...	14 7	...	13 2	18 6	...	...	17 1	80 0	14 0
May ...	14 7	...	13 2	18 6	...	...	17 1	80 0	14 0
June ...	14 7	...	13 2	19 11	...	...	17 1	80 0	14 0
July ...	17 1	...	11 13	19 11	...	...	77 1	80 0	14 0
August ...	13 2	...	10 8	18 6	...	...	17 1	80 0	14 0
September ...	17 1	...	10 8	18 6	...	...	17 1	80 0	14 0
October ...	15 12	...	10 8	18 6	...	...	17 1	80 0	14 0
November ...	17 1	...	10 8	18 6	...	...	17 1	80 0	14 0
December ...	17 1	...	10 8	18 6	...	...	18 6	80 0	14 0
1888.									
January ...	15 12	...	13 2	19 11	...	...	18 6	80 0	9 0
February ...	15 12	...	10 8	21 0	...	...	21 0	80 0	9 12
March ...	15 12	...	10 8	21 0	...	...	21 0	80 0	10 8
April ...	14 7	...	11 13	19 0	...	...	21 0	80 0	10 0
May ...	10 8	...	11 13	18 6	...	...	19 11	80 0	10 0
June ...	11 13	...	10 8	17 1	...	...	15 12	80 0	9 0
July ...	15 12	...	10 8	17 1	...	...	18 6	80 0	8 0
August ...	15 12	...	10 8	17 1	...	...	18 6	80 0	8 0
September ...	14 7	...	10 8	17 1	...	...	18 6	80 0	8 0
October ...	11 13	...	10 8	15 12	...	...	17 1	80 0	11 0
November ...	11 13	...	10 8	21 0	...	...	17 1	80 0	11 0
December ...	13 2	...	11 13	19 11	...	...	18 6	80 0	11 0
1889.									
January ...	13 2	...	11 13	18 6	...	...	19 11	80 0	11 0
February ...	13 2	...	11 13	17 1	...	...	21 0	80 0	12 0
March ...	13 2	...	10 8	17 1	...	...	21 0	80 0	11 0
April ...	14 7	...	10 8	14 7	...	...	21 0	80 0	11 0
May ...	10 8	...	10 6	13 2	...	...	19 11	80 0	8 0
June ...	9 13	...	10 8	13 2	...	...	19 11	80 0	8 0
July ...	11 13	...	10 8	14 7	...	...	18 6	80 0	11 0
August ...	11 13	...	10 8	15 12	...	...	19 11	80 0	11 0
September ...	13 2	...	10 8	15 12	...	...	21 0	80 0	11 0
October ...	13 2	...	10 8	15 12	...	...	20 5	80 0	11 0
November ...	14 7	...	10 8	18 6	...	...	20 5	80 0	11 0
December ...	13 2	...	10 8	18 6	...	...	15 2	80 0	11 0
1890.									
January ...	11 13	...	10 8	22 5	...	...	15 12	80 0	11 0
February ...	13 2	...	10 8	21 0	...	...	14 7	80 0	11 0
March ...	13 2	...	10 8	18 6	...	...	15 12	80 0	11 0
April ...	11 13	...	10 8	18 6	...	...	15 12	80 0	11 0
May ...	10 8	...	10 8	17 1	...	...	14 7	80 0	8 0
June ...	10 8	...	10 8	17 1	...	...	14 7	80 0	8 0
July ...	15 12	...	10 8	17 1	...	...	14 7	80 0	8 0
August ...	15 12	...	10 8	18 6	...	...	14 7	80 0	10 0
September ...	14 7	...	10 8	18 6	...	...	14 7	80 0	10 0
October ...	14 7	...	10 8	21 0	...	...	15 12	80 0	11 0
November ...	11 13	...	10 8	21 0	...	...	14 7	80 0	11 0
December ...	13 2	...	10 8	19 11	...	...	14 7	80 0	11 0
1891.									
January ...	13 2	...	10 8	18 6	...	...	15 12	80 0	11 0
February ...	13 2	...	10 8	18 6	...	...	18 6	80 0	11 0
March ...	13 2	...	10 8	18 6	...	...	18 6	80 0	11 0
April ...	13 2	...	10 8	19 11	...	...	17 1	80 0	11 0
May ...	10 8	...	10 8	17 1	...	...	15 12	80 0	11 0
June ...	10 8	...	11 13	17 1	...	...	17 1	80 0	11 0
July ...	11 13	...	10 8	17 1	...	...	15 12	80 0	11 0
August ...	11 13	...	10 8	15 12	...	...	14 7	80 0	11 0
September ...	10 8	...	10 8	14 7	...	...	13 2	80 0	11 0
October ...	10 8	...	10 8	14 7	...	...	13 8	80 0	11 0
November ...	10 8	...	10 8	14 7	...	...	13 8	80 0	11 0
December ...	...	...	...	...	...	...	...	...	...

STATEMENT III—*Showing the quantities of different articles sold per rupee in seers and decimals of a seer of 80 tolahs.*

	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.
Rice (common) . .	33·45	20	28	31	23	7	14	28	21	29·4	26·1	26·8	30	25	25·4
Wheat	20·97	20·18	23 34	17·68	12·78	1·61	9·79	17·6	8·72	20·41	13·88	17·27	16·1	15·65	18·94
Mandua (Elusine corocana)	..			...		...	...		..				17·56	19·15	22·64
Gram	29 76	21·57	18·36	31·08	33·71	8 85	12·62	24·27	24·6	23·86	30·04	25·16	27·31	25 13	17·02
Arhar										...					
Salt ...	16·4	15·99	9 43	9·08	9·08	10·17	9·1	9·08	9 1	9·02	8·96	8·28	9 4	9·7	11 05

	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888	1889	1890.	1891.
Rice (common) ...	26·8	16·6	14·4	15·4	18·8	29·8	30·8	27·2	18·29	16 88	16 89	18 93	18·92	16·08	18·87	16·57
Wheat . ..	19·8	14·67	10 37	11·35	18 78	18·79	15·2	13·12	17·66	18·21	16 35	14·79	14	12 40	13 12	11·4
Mandua (Elusine corocana) ...	24·16	20·67	15·12	15·22	14·85	18·22	14·21	16·55	15·51	17·01						
Gram	26·36	17·38	15·49	15·14	17·66	24 92	22·30	20·23	22·47	17·09	18·59	17·06	18·9	19·08	14·82	15·53
Arhar ..	..	...		...	...	...	.			...		16·73	17·63	17·01	18·54	17 96
Salt	12·96	11·3	10·12	11·3	11·4	11	12·8	13·8	14·02	14	14	13 87	9·07	10·33	9 95	10·92

The figures given in Statement III have been compiled from the "Prices and Wages of India" prepared by the Statistical Branch of the Finance and Commerce Department of the Government of India.

The following are the average prices of different kinds of articles, as ascertained by me, at the many *háts* held all over the district. The figures given represent the prices per *seer*:—*Salt* (7 pice), coarse rice (3 to 4 pice), *kulthi* (3 to 4 pice), *birhi* (5 to 6 pice), *mung* (4 to 8 pice), milk (4 pice), *ghi* (1 rupee), mustard oil (8 annas), cocoanut oil (8 annas, brinjáls (2 pice), turmeric (3 to 8 annas), chillies (6 annas), garlic (2 to 4 annas), *gúr* (10 to 14 pice), cotton (8 pice), betelnuts (5 annas), brass utensils (Re. 1-2), bell-metal utensils (Re. 1-11).

APPENDIX IX.

WEIGHTS AND MEASURES.

Weights.

(1) *Grains*—Rice and other grains are sold on the fields and in country villages to merchants according to the following measure :—

4 chitaks	=	1 pao.
4 paos	=	1 seer.
5 seers	=	1 gauni.
8 gaunis	=	1 maund (1 seer being equal to 105 tolas).
80 gaunis	=	1 bharan.

The *gauni* is a basket which varies in size in different parts of the district, having a capacity of holding 2 to 6 Cuttack seers. (A Cuttack seer weighs 105 tolas, whereas a Balasore seer weighs 80 tolas).

In some villages in the interior the *gauni* is taken equivalent to 12 Balasore seers after the measurement used in Balasore.

The following nomenclature is also used for corn measurement :—

Tables of corn measures.

Prevalent chiefly in Jajpur and in the eastern part of the Kendrapara subdivision.		Prevalent in some places in the Sadar subdivision.	
16 biswas	= 1 gauni.*	16 biswas	= 1 gauni †
3 gaunis	= 1 nauti.	20 gaunis	= 1 chhela.
10 gaunis	= 1 pauti.	4 chhelas	= 1 bharan.
5 pautis	= 1 chhela.		
20 pautis or 4 chhelas	= 1 bharan.		

* 1 gauni = 2 Cuttack seers. | † 1 gauni = 5 Cuttack seers.

(2) *Liquids.*—Shopkeepers in towns and merchants use the *liquid* measure in selling rice, which is as follows :—

4 paisá	=	1 chitak.
4 chitaks	=	1 pao.
4 paos	=	1 seer.
5 seers	=	1 pasuri.
8 pasuris	=	1 maund.

(3) *Vegetables, &c.*—The weight measures for vegetables are as follow :—4 *marhs* = 1 *karsi;* 4 *karsis* = 1 *pal;* 20 *pals* = 1 *bisa* or *gara.* For sugar, molasses, &c., the *bisa* = 24 *pals.* A *bisa* of 27 or 28 *pals* is used in some places. Vegetables are also sold by the *seer* or by the number.

(4) *Gold and precious stones.*—These are weighed according to the following standard :—10 *china* = 1 *marh;* 1 *china* = 4 *rati;* 4 *dhan* = 1 *rati;* 8 *rati* = *mashá;* 10 *mashá* = 1 *bhari* or *tola*, which is equivalent to 180 grains Troy weight

(5) *Medicines* are measured according to the gold standard with the exception that 12 mashá = 1 tolá.

Other Measures.

(1) *Cloth.*—The shopkeepers adopt the following measure :—1 *girá* = 3 *anguli* or fingers; 8 *girá* = 1 hát or cubit; 2 *háts* = 1 *gaj* or yard. The hawkers, however, who sell their goods to Europeans, use the ordinary English measures.

(2) *Distance.*—The measures are as follow :—6 *till* = 1 *job* or anguli (finger); 4 *anguli* = 1 *mushti* (the width of the fist); 3 *mushti* = 1 *chákhand* (span); 2 *chákhand* = 1 *hát* (cubit); 4 *háts* = 1 *dhanu;* 2,000 *dhanu* = 1 *kos;* 4 *kos* = 1 *yoján* or *nine miles.* Besides the above, there is current among the villagers the *dalbanga kos*, being the distance walked over at an ordinary speed, until the leaves have withered of a branch of a tree broken off by the pedestrian and taken along with him in his hand while he is walking.

(3) *Land.*—In Cuttack, land is measured by a rod called the *padika* which differs in length in different *parganas*, varying from 6 feet 3½ inches to 11 feet 10 inches, as will be seen from the following table—

NAME OF PARGANA.	Length of each padika.	
	Ft.	In.
Bakrabad	6	3½
	7	5
	7	11
	8	0
	8	2
	8	5
	8	5½
	8	6
	8	8
	8	8½
	8	9½
	8	10
	8	11
	9	0
	10	0
Kate	10	5&c.
	9	8&c.
Jhankar	10	5&c.
	7	4
	7	6&c.
Paenda	10	5&c
	10	6
	10	7
	10	7½
	10	8
	10	8½
Kodinda	10	5&c.
	10	0
	10	6
Asureswar	10	5&c.
	9	6
Atkhanata	10	5&c.
	10	0
Jajpur	10	5&c.
	8	8
Baruya	10	5&c.
	8	9½
	9	5
	9	6
	9	9
	9	10
	9	11
	10	3
	10	4
	10	4½
	10	5
	10	5½
	10	6
	10	7
	10	7½
	10	8
	10	9
	10	10
	10	11
	10	11½
	11	0
	11	1
	11	1½
	11	2½
	11	3½
	11	4½
	11	5
	11	8
	11	9
Shergarha	10	5&c.
	8	6
Shergarha	8	7
	10	10½
	11	3
	11	6
	11	7
	11	10
	11	11
Padamapur	10	5&c.
	8	11½
	9	6
	9	8
	9	10
	9	10½
Saïbir	10	5&c.
	8	11
Matkadnagar	10	5&c.
	10	9
	11	0
Cuttack	8	0
	10	1
Karimul	8	2
	8	4
	8	6
	8	8½
	9	8
	9	8½
	9	9&c.
	9	10
	9	11
Ahiyas	8	2
Katiya	8	2
Bahurupa	8	11
Tapankhand	9	1
	9	6
	10	4
Dalijora	9	3
	10	3
Dolgram	9	3
Kokuyakha	9	6
	9	7
	9	8
	9	8½
Kuhunda	9	6
Keruyalkhand	9	6½
	9	7
	9	7½
	9	8
	9	6½
	9	10½
Mutri	9	9
Matkadabad	10	0
	10	4
Olash	10	9
	10	10
	10	11
	10	11½
	11	0
	11	1
	11	0½
	11	3½
	11	10
Kanchikhand	11	3
Dihirathpore	10	10
Jaypur	10	10
Kuhunda	9	6
	10	10

The padikas of the other parganas measure 10 feet and 5 inches.

The lineal measurement adopted in the district is as follows:—6 *angulis* = 1 *dasti* 4 *dasti* = 1 *hath* (cubit); 4 *hath* = 1 *padika*. This *padika* of 4 *hath* or cubits is known as the 16 *dastipadika*; that of 4½ cubits the 18 *dastipadika*; that of 5 cubits the 20 *dastipadika*; that of 6 cubits the 24 *dastipadika*; that of 6½ cubits the 26 *dastipadika*; and so on. The term *dasti* is derived from the Persian *dast*, meaning the palm of the hand, and in measurement the length of the palm from the wrist joint to the lowest joint of the middle finger. In the measurement of land, it is the custom to allow a little in excess of the *padika*. Square measurement is calculated from the *padika*, thus:—1 square *padika* = 1 *biswa*; 16 *biswa* = 1 *gunt*; 25 *gunt* = 1 *mán*; 20 *man* = 1 *bati*. Four *kani* (a *kani* = 5 *ganda*) are also taken as equivalent to 1 *biswa*.

A *padika* is also represented by 4 *pan*, and a square padika is thus equivalent to 16 square pan and 16 square pan = 1 *kahan* or 1 *biswa*. The area is obtained as in English measurements by multiplying the length by the breadth. Thus, if a piece of land measured 1 kahan 5 pan in length and 12 pan in breadth, the area would be equal to 1 kahan 5 pan × 12 pan or 252 square pans, which = 15 *biswa* 3 *kani*. To reduce a *mán* of land to the English standard measurement, the *padika* measurement would be adopted. Taking, for instance, a *mán* of land in a *pargana* where the length of the *padika* is 10 feet 6 inches, a *mán* being = 25 × 16 or 400 biswa, and 1 biswa, being = 1 square padika, a *mán* would be equivalent to 400 square padika or 20 × 20 padika; so that the area would amount to (20 × 10½ feet) × (20 by 10½) = (210 × 210) square feet = 43,100 square feet, which in this instance, it may be observed, is nearly equivalent to a standard acre of 43,560 square feet.

(4) *Coin.*—The *kauri* measure, in which formerly all kinds of transactions were carried on and Government salaries also paid, is still current, though in very few villages. The standard is as follows:—3 *kranti* = 1 *kauri*; 4 *kauri* = 1 *ganda*; 5 *ganda* = 1 *kani* or *buri*; 4 *kani* = 1 *pan*; 4 *pan* = 1 *padika*; 4 *padika* = 1 *kahan*.

In 1804, the rupee was equivalent to 7,680 *kauri*. It is now said to be equivalent to 5,120 *kauri*.

The coin measure generally prevalent is the same as that throughout Bengal.

APPENDIX X.

STATISTICS OF IRRIGATION.

Financial aspects and capital.—The net total direct charges on Capital Account to the end of the year 1891-92 has been Rs. 2,46,06,666, and the total indirect charges, exclusive of interest, to the end of the same period has been Rs. 5,54,230, so that the total outlay on Capital Account of the Orissa Canals from the beginning of the Orissa project to the end of the year 1891-92 has been Rs. 2,51,60,896 (excluding interest).

Interest account.—The total interest charges to the end of the year 1891-92 has been Rs. 1,66,70,158.

Revenue account.—From reports obtained from the Superintending Engineer's office in Cuttack, I found that the total expenses from the first opening of the canals to the end of 1889-90 were Rs. 61,62,907, and the total receipts for the same period Rs. 33,35,907.

From the Irrigation Report for the year 1891-92, I find that the total working expenses for the years 1890-91 and 1891-92 have been respectively Rs. 4,67,603 and Rs. 4,23,086, and that the total receipts for the same two years have been Rs 3,44,936 and Rs. 3,70,922 respectively. Compiling these figures, the financial results of the Orissa Canal from the beginning of the project to the end of the year 1891-92 would stand thus:—

	Rs.
Total expenses	70,53,596
Total receipts	40,51,765
Deficit ...	30,01,831

Receipts and expenditure.—There are no separate reports for the Cuttack district showing the details of receipts and expenditure incurred in canals; but the following statement taken from the Irrigation Report for 1891-92 will be found useful in showing the revenue receipts and working expenses of all Orissa Canals for the ten years 1882 to 1892:—

PARTICULARS.	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.	1888-89.	1889-90.	1890-91.	1891-92.
1	2	3	4	5	6	7	8	9	10	11
RECEIPTS.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Water-rates	1,80,325	1,11,856	51,245	1,06,842	96,976	1,37,800	1,51,365	1,99,844	2,09,806	2,17,256
Navigation	1,08,473	1,10,152	79,802	84,012	67,048	7,11,004	77,908	88,632	1,21,498	1,35,902
Miscellaneous	31,212	15,860	12,538	16,496	15,587	14,171	14,242	15,747	13,705	17,843
Total ..	3,20,010	2,37,868	1,43,585	2,07,350	1,79,611	2,23,044	2,43,515	3,04,223	3,45,012	3,71,001
Less—Refunds of revenue ...	385	68	78	6	92	365	221	99	76	79
Total receipts ...	3,19,625	2,37,800	1,43,507	2,07,344	1,79,519	2,22,679	2,43,294	3,04,124	3,44,936	3,70,922
WORKING EXPENSES.										
Direct charges.										
I.—Works, maintenance and repairs—										
Works (extension and improvements)	......	......	......	......	......	......	......	......	......	5,001
Repairs	2,22,431	1,89,617	2,03,137	2,22,690	3,32,761	3,10,980	2,36,694	2,31,068	2,22,638	1,70,637
Establishment, including direction and accounts ...	51,160	43,600	50,958	51,199	81,117	98,153	70,201	1,09,434	1,32,859	1,19,775
Tools and plant	14,923	11,292	15,167	19,159	15,486	16,391	21,156	19,722	13,951	27,023
Profit and loss	......	......	......	......	......	......	......	......	1,225	......
Direct expenditure in England	2,061	427	......	......	.....	...	......	....	......	......
Total ...	2,90,575	2,44,936	2,69,262	2,93,048	4,49,364	4,25,524	3,28,051	3,60,224	3,70,673	3,22,436
II.—Revenue management—										
Irrigation establishment ...	37,002	33,432	33,999	34,304	37,005	40,300	43,161	55,502	52,591	57,074
Navigation ditto	13,578	14,681	12,398	15,219	15,471	15,125	15,734	15,871	16,119	16,506
Total ...	50,580	48,113	46,397	49,523	52,476	55,425	58,895	71,373	68,710	73,580
Total direct charges ...	3,41,155	2,93,049	3,15,659	3,42,571	5,01,840	4,80,949	3,86,946	4,31,597	4,39,383	3,96,016
Indirect charges.										
Capitalized abatement of land revenue	......	......	......	......	......	......	......	......	......	......
Leave and pension allowances ...	13,741	12,840	13,629	14,101	18,703	21,501	18,073	25,313	28,220	27,070
Total indirect charges ...	13,741	12,840	13,629	14,101	18,703	21,501	18,073	25,313	28,220	27,070
Total working expenses ...	3,54,896	3,05,889	3,29,288	3,56,672	5,20,543	5,02,450	4,05,019	4,56,910	4,67,603	4,23,086
Net revenue	(—)35,271	(—)68,089	(—)1,85,781	(—)1,49,328	(—)3,41,024	(—)2,79,771	(—)1,61,725	(—)1,52,786	(—)1,22,667	(—)52,164

From the results tabulated above, it will be seen that from the year 1886-87 the receipts have been steadily increasing, while the working expenses have also decreased. The deficit is also less, but the total expenditure is still in excess of the revenue derived from the canals, so that the financial prospects of the canals cannot yet be regarded as very satisfactory. The Chief Engineer to the Government of Bengal, however, expresses a hope in the abovementioned report that with the extension of irrigation consequent on the completion of new distributaries, the yearly deficit will be replaced by a surplus.

Irrigation capabilities.—Area.—The following table compiled from the Irrigation Report for the year 1891-92 hows the lengths of the canals and distributaries in operation in Cuttack at the close of that year:—

NAME OF CANAL.	LENGTH OF CANAL OPEN—		Length of distributaries and village channels.	Area protected from flood.	Area under command.	Area provided with distributaries.	Area irrigated.	Percentage of area irrigated to area provided with distributaries.
	For irrigation and navigation.	For irrigation only.						
	Miles.	Miles.	Miles.	Acres.	Acres.	Acres.	Acres.	Acres.
Taldunda	51¾	...	76¼	75,278	75,278	21,850	41,906	54·90
Machgong	4	28	149¾	97,057	97,057	54,480		
Kendrapara ...	39	...	363½	129,421	101,110	95,120	74,180	53·34
Gobri with extension ...	24	...	15¼	27,251	53,290	6,118		
Patamundi	...	47	98½	65,600	51,250	37,829		
Kendrapara Extension ...	15	...	...	8,960	7,000	...	...	...
High Level, Range I ...	33	...	131¼	80,128	48,815	48,815	22,423	45·93
Ditto, „ II ...	12½	...	...	...	10,000	...	2,513	...
Jajpur	6½	...	6½	...	70,000	600	452	75·33
Total ...	185¾	75	841	483,695	513,800	264,812	141,474	53·42

From the above it will be seen that the total length of main canals of all kinds open in the Cuttack district is altogether 260¾ miles, and the length of all distributaries inclusive of village channels is 841 miles.

Some idea will be given of the progress that has been made during the ten years 1880 to 1890, by the Irrigation Department, in providing the district with distributaries by glancing at the figures now given:—

YEARS.	Area of distributaries.
	Acres.
1880-81	181,315
1881-82	181,315
1882-83	181,315
1883-84	182,380
1884-85	188,880
1885-86	189,880
1886-87	201,317
1887-88	205,017
1888-89	208,419
1889-90	208,819

The area has thus increased in this period by 27,504 acres, and within the two years, 1890 to 1892, there has been a further increase of 55,993 acres.

The progress which has been made in the areas leased from the very first year in which the cultivators availed themselves of canal irrigation to the end of the year 1892 is given in the subjoined table. The figures have been compiled from canal irrigation reports and notes in the office of the Superintending Engineer of Cuttack :—

YEAR.	CANALS.						Total leases.
	Kendrapara canal system.	Taldanda canal system.	High Level, Ranges I and II.	High Level, Range I.	High Level, Range II.	Jajpur.	
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
1866-67 ...	...	...	...	...	...	...	667
1867-68 ..	...	...	...	...	...	...	1,842
1868-69 ...	...	...	...	...	...	...	9,378
1869-70 ...	1,564	...	165	...	...	...	1,729
1870-71 ...	8,967	999	12,162	...	...	...	22,128
1871-72 ...	3,860	292	7,501	...	...	...	11,653
1872-73 ...	4,318	198	237	...	...	...	4,753
1873-74 ...	7,825	1,733	3,013	...	...	...	12,571
1874-75 ...	11,105	4,094	7,260	...	...	...	22,459
1875-76 ...	11,577	1,271	5,561	...	...	...	18,409
1876-77 ...	17,206	5,157	8,019	...	...	...	30,382
1877-78 ...	53,769	32,604	12,122	...	...	...	98,495
1878-79 ..	61,083	36,097	14,070	...	...	...	111,250
1879-80 ...	57,641	37,278	13,905	...	...	...	108,824
1880-81 ...	61,871	39,400	14,205	...	...	...	115,476
1881-82 ...	70,627	43,941	15,871	...	...	...	130,439
1882-83 ...	72,468	44,731	14,244	...	...	...	131,443
1883-84 ...	23,685	10,300	12,260	...	...	...	46,245
1884-85 ...	32,118	10,369	11,914	...	...	...	54,401
1885-86 ...	35,179	18,796	...	13,609	265	...	67,849
1886-87 ...	47,631	22,112	...	13,612	407	...	83,762
1887-88 ..	51,890	29,975	...	14,605	744	...	97,214
1888-89 ...	72,796	40,391	...	18,092	2,385	...	133,664
1889-90	77,874	40,246	...	26,599	2,563	...	147,282
1890-91 ...	74,970	41,806	...	21,984	2,503	...	141,263
1891-92 ...	74,180	41,906	...	22,423	2,513	452	141,474

The table shows a good many fluctuations which, however, are easily explained, when it is remembered that irrigation from canals is altogether voluntary. The raiyats as a rule do not enter into new leases unless and until they are compelled to do so from fear of a failure of their rice crop due to deficiency of rainfall from July to October, a critical period for the cultivation of rice. Hence it is, in a season of drought, the leases quickly run up.

Taking note of the leases entered into within the ten years 1880 to 1890, and keeping in view the fact that the greater part of the leases are now entered into by the cultivators for a period of five years, we find the total area leased in the Cuttack district gradually increasing from 1878-79, until the highest number was reached at the end of the quinquennial period in 1882-83. A large proportion of the leases were not renewed in 1883-84, and the area accordingly fell to 46,245 acres; but year by year the number again increased until at the close of the second quinquennial period the total was raised by 50,969 acres. The next year the number did not fall, chiefly owing to a deficiency of rainfall in the latter part of the irrigating season of the year 1888, when there was quite a rush for canal water. It has again been increasing since.

Taking a review of the ten years 1880 to 1890, which covers periods in which the raiyats have been averse to renewing leases or taking them out, for the first time, and in which there has been a rush for leases due to the scarcity of rainfall at critical periods, we find from the figures that have preceded that the average area leased for the purpose of irrigation, taking good and bad seasons, bears a proportion of 51·76 per cent. to the area provided with distributaries.

The following statement compares the areas of each crop irrigated during the years 1882 to 1892, with the yearly rainfall:—

YEARS.	Kharif.	Rabi.	Perennial.	Total.	Rainfall.
1	2	3	4	5	6
	Acres.	Acres.	Acres.	Acres.	Inches.
1882-83	128,530	4,100	398	133,028	59·03
1883-84	47,035	1,381	344	48,760	57·21
1884-85	54,181	2,994	197	57,372	50·40
1885-86	70,563	1,605	171	72,339	52·59
1886-87	75,115	2,440	154	77,709	60·07
1887-88	108,867	502	137	109,506	47·84
1888-89	156,319	2,779	194	139,292	49·07
1889-90	180,568	5,897	162	186,627	67·95
1890-91	175,829	4,250	220	180,299	63·17
1891-92	173,453	3,943	289	177,685	61·03

Crop experiments.—A large number of experiments are carried on under the supervision of the Executive Engineers of the different divisions of the Orissa Circle, in order to ascertain the outturn of paddy on irrigated and unirrigated lands, lying within the areas commanded by the different canals, the object being to impress upon the cultivators the utility of canal irrigation and to show them that they really get their money's worth for the water supplied.* The following table, which has been condensed from the reports of the Irrigation Department, shows the results that have been obtained within the five years ending 1890 It would have been more satisfactory to have worked out the figures for the decade 1880 to 1890, but in the years preceding 1885-86, the valuation of straw has not been shown in any of the reports, and calculations based therefore on guesswork would at best have given but a rough estimate:—

NAME OF YEAR.	OUTTURN PER ACRE FROM IRRIGATED LAND.		OUTTURN PER ACRE FROM UNIRRIGATED LAND.		VALUE OF OUTTURN FROM IRRIGATED LAND.		VALUE OF OUTTURN FROM UNIRRIGATED LAND.		Total value of grain and straw from irrigated land.	Total value of grain and straw from unirrigated land.	Gain or loss per acre due to irrigation.
	Grain.	Straw.	Grain.	Straw.	Grain at Re. 1 per maund.	Straw at 9 maunds per rupee.	Grain at Re. 1 per maund.	Straw at 9 maunds per rupee.			
	Mds.	Mds.	Mds.	Mds.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1885-86	15·73	23·90	11·44	17·06	15·67	2·35	11·39	1·77	18·02	13·16	+ 4·86
1886-87	15·66	23·87	12·25	10·29	15·61	2·40	12·21	1·94	18·01	14·15	+ 3·86
1887-88	12·32	16·84	9·38	12·00	12·25	1·67	9·31	1·19	13·92	10·50	+ 3·42
1888-89	16·23	20·12	11·02	14·02	16·23	2·24	11·02	1·56	18·47	12·58	+ 5·89
1889-90	21·01	23·00	13·71	14·40	21·01	2·56	13·71	1·60	23·57	15·31	+ 8·26

From the above table it will be seen that the greatest difference in the amount of grain was in the year 1889-90, when the amount in favour of the irrigated land was 7·30 maunds per acre, and the least difference between irrigated and unirrigated areas was in the year 1887-88, when the amount in favour of irrigation was only 2·94 maunds per acre. The average amount of grain in favour of irrigation during the years under review has been 4·63 maunds per acre.

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* In order to make the experiments as accurate as possible, they are numerous, and scattered over the whole area commanded by the canals.

The difference in the outturn of straw was most marked also in 1889-90, when the increase due to irrigation amounted to 8·60 maunds per acre. The smallest increase in straw was 4·84 maunds per acre in 1887-88. The average outturn of straw in favour of irrigation for the same number of years has been 6·09 maunds per acre.

From the last column of the table, where I have shown the gain or loss per acre, it will be seen that the average gross profit has been Rs. 5·25; but this takes no account of the extra expenditure incurred by the use of irrigation water, which amounts to Rs. 2 per acre, as follows:—Water-rate Re. 1-8 per acre, and extra labour 8 annas per acre. Deducting this amount, therefore, the table shows that the net profit per acre due to irrigation for the five years 1885 to 1890 has been Rs. 3·25.

Water-rates.—The water-rates per acre, which are in force on the Orissa Canals, is given in the subjoined statement which was obtained by me from the Superintending Engineer's office. The statement also gives an idea of the different kinds of crops irrigated by canal water:—

CANALS.	Different sorts of leases and crops on which the rates are charged.	WATER-RATES.					
		Flow.			Lift.		
		Rs.	A.	P.	Rs.	A.	P.
Orissa Canals ...	I.—For the whole irrigable or rice-cultivated area of any village, if application is made for a lease of five years.	1	8	0	1	0	0
	For the rice crop.						
	II.—For any fractional area of a village or for other term.	3	0	0	2	0	0
	For cold-weather crops.						
	III.—Dalua rice	1	8	0	1	0	0
	IV.—For cotton, tobacco, haldi, ginger, wheat, vegetables, indigo, and all garden produce grown in villages, the rice lands of which are leased under rate I.	1	0	0	0	10	0
	V.—For the above produce when grown in villages, the rice lands of which are not leased under rate I.	2	0	0	1	8	0
	VI.—For linseed, oil-seeds, dal, and all pulses grown in villages, the rice lands of which are leased under rate I.	0	8	0	0	5	0
	VII.—For the above produce when grown in villages, the rice lands of which are not leased under rate I.	1	0	0	0	10	0
	For perennial crops.						
	VIII.—For sugarcane	6	0	0	4	0	0
	IX.—The charge for filling tanks is Re. 1 per 10,000 cubic feet of water used.	......			......		

Abstract of Register of Embankments showing the names of rivers and banks on which they stand in the Mahanadi division.

NAME OF RIVER.	Name of bank.	LENGHT OF EMBANKMENTS.	
		Miles.	Feet.
Paika	Right ...	8	1,430
Patuali	Do. ..	1	99
Mahanadi	Left ...	3	3,727
Ditto	Right ...	34	3,153
Suk Paika	Left ...	5	3,305
Ditto	Right ...	18	3,660

NAME OF RIVER.	Name of bank.	LENGTH OF EMBANKMENTS.	
		Miles.	Feet.
Punkpal	Left	2	4,108
Ditto	Right	6	4,588
Katjuri	Left	23	4,697
Ditto	Right	27	4,099
Alanka	Left	5	2,009
Burra Alanka	Do.	17	2,477
Ditto	Right	27	2,802
Chota Alanka	Left	8	1,408
Ditto	Right	2	1,075
Biluakhai	Left	4	4,065
Ditto	Right	1	1,275
Suna Katta	Left	...	1,871
Tumpua	Do.	2	87
Ditto	Right	1	2,106
Goda	Left	5	864
Gobri	Do.	1	3,573
Devi	Do.	21	193
Gardoah	Do.	...	4,495
Kundah	Do.	...	2,905
Mudrang	Do.	...	1,776
Total	...	233	2,487

Abstract of Register of Embankments showing the names of rivers and banks on which they stand in the Brahmani-Baitarani division.

Mahanadi	Left	11	3,223
Kani	Do.	1	770
Paika	Do.	12	645
Chitartala	Right	8	500
Ditto	Left	17	1,240
Nun	Right	7	3,295
Do.	Left	4	276
Bhagni	Right	2	3,820
Do.	Left	2	790
Bhundaria	Right	...	1,460
Ditto	Left	...	2,825
Pothi	Right	2	1,918
Do.	Left	...	3,300
Birupa	Right	10	3,998
Do.	Left*	15	2,640
Brahmani	Right	28	1,940
Ditto	Left	10	3,990
Chota Brahmani	Do.	10	2,536
Babarjore	Do.	2	1,940
Gobri	Right	3	4,210
Do.	Left	1	3,080
Gandakia	Do.	5	1,355
Kana Nadi	Right	10	400
Kharsua	Do. *t*	4	4,860
Patia	Do. } *t*	2	3,300
Brahmani	Left		
Kimiria	Right *t*	9	1,494
Do.	Left	3	3,215
Burra Genguti	Do.	4	2,230
Gind Nullah	Do.	1	1,340
Dhudai	Right	1	392
Do.	Left	3	2,545
Total	...	200	987

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* The Burra Genguti and the Birupa Left go under the name of Birupa Left.

Those marked *t* were transferred from the Brahmani-Baitarani division to the Acquapada-Jajpur division on the 1st of July 1891.

Abstract of Register of Embankments showing the names of rivers and banks on which they stand in the Purí division.

NAME OF RIVER.	Name of bank.	LENGTH OF EMBANKMENTS.	
		Miles.	Feet.
Katjuri	Right	6	786
Sarol	Left	8	654
Do.	Right	10	200
Goda	Do.	1	2,263
Devi	Do.	10	1,960
Kundal	Do.	7	2,504
Do.	Left	3	2,654
Dobi Khai	Right	...	4,335
Old Devi	Do.	...	5,200
Ditto	Left	...	4,575
Akhara	Do.	1	1,380
Towrah	Right	1	2,275
Mugrah	Left	1	...
Bindhan	Right	4	790
Parachi	Do.	...	520
Ditto	Left	2	3,990
Kandia	Do.	...	2,560
Parachi stream to Bay of Bengal	Right	...	1,720
Kadua	Do.	...	2,400
Koyakhai	Do.	13	100
Ditto	Left	11	2,767
Kusbhudra	Right	10	2,988
Ditto	Left	11	1,985
Mugai	Right	1	4,290
Do.	Left	2	2,040
Dhunua	Right	3	5,245
Ditto	Left	1	1,975
Bulbhudra	Right	2	3,025
Bargoni	Do.	56	1,998
Ditto	Left	47	2,861
Kamriadhara	Right	1	4,020
Ditto	Left	1	4,120
Bengai	Right	2	1,558
Do.	Left	3	435
Surlake	...	15	3,103
Kanchi	Right	5	3,635
Ditto	Left	3	1,270
Dhauria	Right	3	655
Ditto	Left	2	1,585
Uttaranullah	Right	4	715
Ditto	Left	2	795
East Kaniat	Right	4	3,273
Sonamoi	Do.	10	4,835
Nyah	Do.	5	1,030
Do.	Left	2	4,675
Dakhin Kawa	Right	4	2,790
Ditto	Left	3	2,350
Ratanchira	Right	9	699
Ditto	Left	2	...
Chuigiria	Do.	1	4,500
Nun	Right	12	987
Do.	Left	9	339
Petye	Right	1	420
Chilka Lake	...	3	...
Dyah	Right	8	3,214
Do.	Left	32	958
Mangoni	Right	5	1,117
Ditto	Left	4	430
Total	...	389	2,108

Abstract of Register of Embankments showing the names of rivers and banks on which they stand in the Aquapada-Jajpur division.

NAME OF RIVER.	Name of bank.	LENGTH OF EMBANKMENTS.	
		Miles.	Feet.
Baitarani	Right	22	586
Ditto	Left*	21	2,377
Genguti	Right*	...	1,560
Ditto	Left*	3	452
Kia Nullah	Right	...	1,275
Ditto	Left	...	3,522
Benga	Right	2	1,320
Do.	Left	2	4,440
Salindi	Right*	7	1,330
Kochilla	Do.	...	2,130
Ditto	Left	1	3,640
Bhugchirka Nullah	Do.	...	2,050
Kharsua	Right	4	444
Ditto	Left	17	1,191
Kish	Do.	...	1,877
Burrah	Do.	...	1,500
Junais	Do.	...	4,248
Teesta	Right	...	1,718
Kopally	Do.*	1	2,650
Ditto	Left*	...	3,970
Ditto	Across*	1	290
Chota Kopally	Right*	1	5,220
Ditto	Across*	...	5,165
Total	...	92	155

Those marked with an asterisk are embankments belonging to the Balasore district.

APPENDIX XI.

TRADE STATISTICS.

The following comparative statement will show the progress of the sea-borne trade of the Cuttack district for the thirty years 1860-61 to 1889-90. The figures do not in all instances agree with those given in the reports on the trade of the Orissa ports published by the Government of Bengal, but they have been accepted as reliable, as they have been compiled from local reports:—

STATEMENT I.

YEAR.	Value of imports.	Value of exports.	Total value of trade.
	Rs.	Rs.	Rs.
1860-61	No return	67,590	67,590
1861-62	do.	2,46,570	2,46,570
1862-63	do.	1,78,020	1,78,020
1863-64	3,30,930	1,88,280	5,19,210
1864-65	44,460	2,56,340	3,00,800
1865-66	15,500	32,250	47,750
1866-67	18,48,590	Nil	18,48,590
1867-68	15,70,440	540	15,70,980
1868-69	17,100	19,200	36,300
1869-70	3,10,765	1,86,730	4,97,495
1870-71	10,32,355	6,69,756	17,02,111
1871-72	9,00,133	4,75,700	13,75,833
1872-73	8,49,547	8,21,429	16,70,976
1873-74	11,42,893	10,60,432	22,03,325
1874-75	9,11,659	17,00,471	26,12,130
1875-76	13,80,653	12,71,575	26,52,228
1876-77	11,88,059	29,17,394	41,05,453
1877-78	36,23,812	36,74,817	72,98,629
1878-79	19,28,230	28,28,183	47,56,413
1979-80	13,54.057	27,78,282	41,32,339
1880-81	15,57,282	15,57,752	31,15,034
1881-82	8,47,160	19,93 894	28,41,054
1882-83	1,73,961	29,70,497	31,44,458
1883-84	6,93,469	33,68,315	40,61,784
1884-85	3,29,087	26,49,195	29,78,282
1885-86	2,56,739	29,39,684	31 96,423
1886-87	2,32,544	19,45,510	21,78,054
1887-88	1,19,298	13,69,262	14,88,560
1888-89	39,558	9,73,288	10,12,846
1889-90	1,01,652	16,78,647	17,80,299

Exports.—From an examination of the figures showing the value of exports and imports, it will be seen that there was no exportation whatever in 1866-67, as the country was then deeply afflicted with the miseries of a famine. In the following year also, when there was still a want of food-grain, a nominal quantity of the value of Rs. 540 only was exported. In the year 1874-75 there was increased export over the previous year to the extent of Rs. 7,40,039, due chiefly to the call for grain on account of the famine in Bengal and Bihar. Then, again, in 1876-77 the value of the exportations exceeded even that of 1873-74 by nearly 40 per cent., the increase being due to the famine in South India. The exportation next year increased still more from the same cause, raising the value of the exports by Rs. 7,57,423. In fact, it was in this year that the sea-borne trade reached its maximum both in exports and imports. The year 1880-81 shows a fall in the value of the export trade, due to there being no demand for grain from abroad and to the cheapness of price arising from a good harvest in other places. The value of the exports continued low in 1881-82 owing to the low price of rice. In the following years the exports again rose, chiefly due to the brisk trade in rice, which was largely exported to home as well as to foreign ports, owing to the low price that ruled in the district and in the whole province throughout the year. For the next three years, *i.e.*, up to 1885-86, the value of exports remained high, indicating increase in the export trade of the district. This increase was chiefly due to rice, the surplus produce of the country finding an easy exit to other countries, as the means of communication were being improved. The diversion of the trade to Chandbali affected the exports at False Point from the year 1886-87. There will thus be noticed a decrease since that year in the value of exports. To this cause was added a bad season in the year 1889, when high prices began to prevail, putting a check on the sea-borne export of rice and paddy. In 1890 the export trade again rose with a fall of prices and a demand for rice in Mauritius.

Imports.—The first noticeable increase in the value of imports was in the years of the great famine of Orissa, when there was a great demand of food-grain for the starving thousands in the district. Examining the figures we find that for the six years 1875—81, the import trade in Cuttack was very healthy, consisting chiefly in piece-goods, twist and metals. There was a marked decrease in False Point in 1881-82, which was chiefly due to the diversion of the trade to Chandbali, arising from the improvement of communication between this port and Cuttack, and also of the cheap rates of carriage on this route consequent on the competition of the lines of steamers from Calcutta. Since this year the import trade has never risen at False Point to what it used to be. From this, however, it must not be understood that the import trade of the district has actually decreased. The very low figure of 1888-89, however, shows the existence of a very unhealthy trade during that year. This chiefly arose from a failure of crops and consequent high prices, which had the effect of making traders light-fisted with the money they had acquired.

Two abstracts (Statements II and III) are appended below, showing the import and export trade of the Cuttack district carried by sea during the ten years (1881-82 to 1890-91) exclusive of Government transactions. The statements do not include the exports from Chandbali, as no separate figures are available showing the proportion of the Chandbali trade which flows in from and is distributed into the Cuttack district alone.

STATEMENT II.—THE IMPORT TRADE OF CUTTACK CARRIED BY SEA DURING THE PERIOD 1881-82 TO 1890-91.

STATEMENT II.—*The Import trade of Cuttack*

		QUANTITY.											
		1881-82.		1882-83.		1883-84.		1884-85.		1885-86.		1886-87.	
		English weight.	Indian weight.	English weight.	Indian weight.	English weight.	Indian weight.	English weight.	Indian weight.	English weight.	Indian weight.	English weight.	Indian weight.
			Mds.		Mds.		Mds.		Mds.		Mds.		Mds.
Animals living (for sale)—													
Other kinds	No.	...	...	8	8	...	...	...	...	...	...	...	...
Building materials—													
Lime and limestone	Cwt.	...	...	...	...	...	...	...	...	...	...	...	...
Canes and rattans	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
Coal and coke	Cwt.	50	68	50	68	263	358	31,700	43,047	...	...	...	...
Caoutchouc	"	...	...	...	...	...	...	...	...	...	...	...	...
Cotton, manufactured—													
1. Twist (European)	lbs.	84,432	1,026	8,700	106	17,300	210	...	...	...	...	...	...
2. Do. (Indian)	"	3,850	47	8,950	109	500	6	...	...	...	...	...	...
3. Piece-goods (European).	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
4. Piece-goods (Indian)	"	...	...	...	...	...	...	...	...	...	...	...	...
Borax	Cwt.	3	4	...	...	...	...	...	...	...	...	...	...
Drugs and chemicals—													
2. Non-intoxicating—													
(b) Other sorts	...	...	...	...	...	...	...	...	...	...	...	...	...
3. Intoxicating drugs (other than opium).		...	...	...	...	...	...	...	...	...	...	...	...
Dyeing materials—													
4. Turmeric	...	...	...	...	...	...	...	...	...	...	...	75	102
5. Other kinds	Cwt.	...	...	...	...	...	...	...	...	...	...	...	...
Earthenware and porcelain.	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
Fibrous products—													
1. Jute, raw	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
2. Do., manufactured—													
(a) Gunny bags	No.	95,605	95,605	409,430	409,430	136,120	136,120	104,900	104,900	62,650	62,650	13,750	13,750
(b) Gunny cloth	Yds.	...	...	...	...	4,158	4,158	...	...	...	...	...	...
4. Other fibres, manufactured.	Rs.	...	...	...	...	...	...	25	34	...	...	...	...
Fruits, nuts, and vegetables—													
1. Cocoanuts	No.	...	...	...	...	...	...	2,500	2,500	...	...	80,040	80,040
2. Vegetables and all other kinds.	Rs.	37	50	183	240	59	80	38	51	...	...	...	...
Grain and pulse—													
2. Gram and pulse	Cwt.	10	14	...	...	4	5	2	3	4,921	6,697	...	...
4. Rice, husked	"	13	18	...	...	...	...	3	4	1,545	2,003	...	...
3. Other spring crops	"	...	...	40	54	...	...	...	...	...	...	...	...
5. Rice, unhusked	"	...	...	...	...	...	...	...	...	4,255	5,791	...	...
Hides and skins—													
1. Hides of cattle	No.	...	...	...	...	21	21	...	...	...	...	...	...
Gums and resins	Cwt.	2	3	3	4	...	...	...	...	2	3	...	...
Leather—													
2. Manufactured	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
Liquors	"	...	...	...	...	...	...	...	...	...	...	...	...
Mats	"	...	...	...	...	...	...	...	...	...	...	...	...
Metals and manufactures of metals—													
1. Brass and copper	Cwt.	79	108	206	280	829	1,128	...	...	30	41	121	165
2. Iron	"	203	276	47	64	1,745	2,375	34	46	74	101	4	5
3. Other metals	"	69	94	69	94	441	600	409	556	40	54	37	49
Oils—													
1. Mineral	Gals.	...	...	...	...	...	...	97,008	7,462	120,394	9,029	289,526	26,320
2. Vegetables	"	9,706	1,085	13,341	1,213	15,071	1,256	9,497	730	7,420	556	6,712	610
Opium	Cwt.	197	268	...	...	...	...	5	7	...	...	...	...
Paints and colours	"	78	106	...	...	...	...	...	...	...	...	7	10
Papers and paste board	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
Provisions—													
1. Ghee	lbs.	192,132	2,335	28,280	344	12,070	147	...	...	82	1	1,148	14
2. All other kinds	Rs.	...	...	...	...	...	...	...	1,016	...	...	...	...
Saltpetre, &c.	Cwt.	7	10	...	...	...	...	...	...	...	...	...	...
2. Other saline substances	"	10	14	15	20	15	20	...	...	...	...	...	...
Salt	"	2	3	...	...	1	1	846	...	4,762	6,480	...	...
Seeds—													
2. Oilseeds	Cwt.	2,768	3,768	...	...	...	...	...	...	...	...	...	...
(c) Other kinds	"	27	37	20	27	17	23	...	...	1	1	...	...
Spices—													
(a) Betelnuts	lbs.	6,108	74	6,160	75	16,408	209	6,744	82	30,894	375	13,684	166
(b) All other kinds	"	3,195	39	163,184	1,974	37,512	456	2,596	32	59,388	722	37,264	453
Silk—													
Manufactured (European).	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
Sugar—													
1. Drained	Cwt.	27	38	11	15	25	34	6	8	3	4	75	102
2. Undrained	"	4	5	1	1	...	...	...	...	...	...	...	...
Tea—													
1. Indian	lbs.	547	7	22	...	332	4	20	...	83	1	116	1
2. Foreign	"	...	...	...	...	...	...	...	...	40	...	...	...
Tobacco	"	14,294	174	6,107	74	69,402	844	124	1	847	10	...	...
Wool, manufactured (European).	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
Wool, manufactured (Indian).	"	...	...	...	...	...	...	...	...	...	...	...	...
All other articles of merchandise—													
1. Unmanufactured	"	...	...	...	...	...	...	...	...	...	...	...	...
2. Manufactured	"	...	...	...	...	...	...	...	...	...	...	...	...
Ditto, Government.	"	...	...	...	...	...	...	...	...	...	...	...	...
Wood—													
1. Timber	Cwt.	...	...	...	...	200	272	7,160	9,476	1,100	1,497	...	...
Treasure—													
2. Silver	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
Do., Government	"	...	...	...	...	...	...	...	...	...	...	...	...
Jewellery, &c.—													
Jewellery	"	...	...	...	...	...	...	...	...	...	...	...	...
Stone and marble	Cwt.	1	1	...	...	...	...	...	...	...	...	...	...

carried by sea during the period 1881-82 *to* 1890-91.

								VALUE.									
1887-88.		1888-89.		1889-90.		1890-91.		1881-82.	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.	1888-89.	1889-90.	1890-91.
English weight.	Indian weight.	English weight.	Indian weight.	English weight.	Indian weight.	English weight.	Indian weight.	Rupees.	Rupees.	Rupees.	Rupees.	Rupees.	Rupees.	Rupees.	Rupees.	Rupees.	Rupees.
	Mds.		Mds.		Mds.		Mds.										
...	...	...	...	...	...	...	...	...	64	...	...	...	...	...	...	...	...
...	...	300	409	5	7	2	3	...	...	...	...	...	...	...	140	19	25
...	...	...	...	...	...	...	...	14	...	48	...	...	...	...	...	...	...
...	...	...	...	1,500	20,417	700	...	6	26	721	25,700	...	...	...	...	927	350
...	...	...	...	...	...	...	...	...	...	235	...	...	...	...	...	...	...
...	...	...	...	56	1	...	...	71,101	7,125	8,650	...	...	...	...	...	8	...
600	7	28	...	...	...	...	...	2,725	5,025	350	...	...	...	600	5	...	...
...	...	...	...	...	...	...	...	92,326	1,519	7,621	1,281	...	...	1,190	...	...	...
...	...	...	...	...	...	...	...	332	3,053	3,716	...	...	337	888	...	...	4,450
...	...	...	...	...	...	...	...	74	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	817	708	275	12	...	100	344	18	...
...	...	...	...	...	...	...	...	...	...	...	...	...	58	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	350	...	...	...	...
2	3	6	9	24	33	...	...	...	...	...	...	...	...	76	91	322	...
...	...	...	...	...	...	...	...	...	500	300	70	...	100	...	...	...	...
...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	5	...	...
2,150	2,150	...	...	17,250	...	17,100	17,100	26,539	17,086	31,030	20,312	12,511	2,750	430	...	3,696	3,900
350	300	...	...	...	...	...	...	...	...	2,640	...	...	604	237	...	...	...
...	...	...	...	...	...	...	...	2,218	2,328	3,420	468	2,030	...	56	423	160	20
80,350	...	...	...	...	...	...	...	...	...	...	45	...	1,600	621	...	...	...
...	...	...	...	...	...	...	...	150	1,709	300	118	...	131	...	105	51	195
300	408	...	...	...	...	1	1	35	...	25	11	13,763	...	600	...	...	15
...	...	...	...	...	...	...	...	46	...	...	22	5,150	...	...	...	...	...
...	...	...	...	...	...	...	...	263	126	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	....	...	...	8,511	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	50	...	...	...	...	...	...	...
...	...	...	...	...	...	1	1	14	240	...	...	6	...	...	...	...	17
...	...	...	...	...	...	...	...	1,598	265	446	745	600	20	100	14	60	4,175
...	...	...	...	...	...	...	...	...	10,873	14,225	5,960	7,072	1,651	984	1,833	1,080	832
...	...	...	...	...	...	...	...	30	100	...	30	...	...	...	...	...	...
...	...	...	...	4	5	...	...	3,987	9,416	46,634	...	1,000	6,620	...	...	821	...
...	...	...	...	53	72	1	1	3,100	696	12,943	441	580	100	586	...	788	10
64	87	22	30	14	19	2	3	1,575	3,880	19,545	19,278	1,818	2,671	...	310	275	46
192,743	12,042	8,333	641	157,583	12,122	251,246	20,736	...	} 9,146	19,160 {	38,001	40,411	1,24,265	86,453	4,000	63,640	1,20,094
196	12	841	65	146	11	41	4	9,742			20,537	25,882	18,734	960	814	189	77
...	...	...	...	...	...	...	...	3,42,680	...	...	...	...	...	...	...	...	...
...	...	...	...	24	33	9	12	1,018	406	1,149	118	...	94	...	...	322	150
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	906	...	...
20	...	82	1	...	...	...	...	58,562	8,275	3,405	...	30	420	10	30	...	...
...	...	...	...	...	...	...	...	10,069	3,221	13,005	4,151	6,700	2,729	1,135	2,727	555	1,085
...	...	...	...	...	...	...	...	63	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	..	...	2	20	23	...	...	...	...	...	...	...
77	105	...	...	...	...	...	...	13	...	4	8,750	19,440	...	116	...	...	...
...	...	...	...	...	...	...	...	13,667	...	...	...	...	...	...	...	...	...
124	108	...	...	...	...	...	...	494	22	42	...	68	...	690	...	...	...
...	...	14,480	54	...	...	...	...	...	457	1,446	935	5,740	2,564	...	1,768	...	...
488	5	1,456	24	2,240	27	3,360	41	1,020	6,396	7,396	2,341	2,222	1,971	1,558	120	600	911
...	...	...	...	...	...	...	...	1,839	550	418	...	...	...	...	...	...	...
Qr. lbs.	Seers.																
1 13	20	5	6	2		1	1	512	199	353	100	48	1,181	10	81	23	21
...	...	...	...	...	...	...	...	10	4	...	...	...	...	...	...	...	...
37	...	...	...	68	1	160	2	725	84	308	30	59	47	27	...	34	160
...	...	...	...	...	...	12	...	...	...	...	...	20	...	...	...	...	4
...	...	...	...	113	1	201	2	2,806	3,098	7,450	35	914	...	925	...	76	215
...	...	...	...	...	...	...	...	2,148	315	2,772	...	...	...	...	150	...	47
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	61
...	...	...	...	...	...	...	...	123	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	57,186	26,924	62,123	19,573	7,251	10,811	8,078	5,508	4,238	4,559
...	...	...	...	...	...	...	...	36,593	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	2,000	33,400	5,030	...	...	...	...	...
...	...	...	...	...	...	...	...	16,257	13,600	10,000	1,600	3,000	...	...	...	...	...
...	...	...	...	...	...	...	...	60,000	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	1,984	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	41	...	...	...	...	...	...	...	...	...

STATEMENT III.—*The Export trade of Cuttack*

		QUANTITY.											
		1881-82.		1882-83.		1883-84.		1884-85.		1885-86.		1886-87.	
		English weight.	Indian weight.	English weight.	Indian weight.	English weight.	Indian weight.	English weight.	Indian weight.	English weight.	Indian weight.	English weight.	Indian weight.
			Mds.		Mds.		Mds.		Mds.		Mds.		Mds.
Canes and rattans ...	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
Cotton, raw	Cwt.	8	4	...	...	...	...	...	...	...	...	...	...
Cotton, manufactured—													
Twist and yarn (Indian)	lbs.	...	...	...	...	13,340	162	4,231	51	...	...	...	...
Piece-goods (Indian) ...	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
Twist and yarn (European).	lbs.	...	...	...	...	...	...	6,944	84	...	...	...	...
Drugs and medicines—													
Other sorts, not intoxicating.	"	...	...	...	...	...	...	......	...	...	...	...	...
Dyeing materials—													
Indigo	Cwt.	...	...	...	...	25	...	...	...	...	...	...	...
Turmeric	"	340	463	1,095	1,400	...	...	...	...	...	...	...	...
Other kinds	"	74	101	47	64	113	154	...	...	...	...	...	...
Fibrous products—													
Jute, raw	"	...	...	4	5	...	...	24	33	...	...	...	...
Jute, manufactured—													
Gunny cloth	Pcs.	...	...	...	...	...	...	250	250	...	...	...	...
Do. bags	No.	100	100	4,540	4,540	22,196	22,196	4,850	4,850	...	...	1,350	1,350
Other fibres, manufactured.	Rs.	...	...	...	...	...	...	1	1	...	...	3	4
Fruits, nuts and vegetables—													
Vegetables and all other kinds.	Rs.	...	...	...	...	...	...	50	68	...	...	...	...
Cocoanuts	No.	...	...	2	8	...	...	...	...	...	...	...	...
Grains and pulse—													
Wheat	Cwt.	2,324	3,163	1,998	2,719	753	1,025	2,589	3,524	141	192	2,914	3,966
Gram and pulse ...	"	2,163	2,944	27	37	2,967	4,038	912	1,241	4 799	6,532	5,539	7,539
Rice, husked	"	386,525	4,58,045	644,032	8,76,599	814,965	11,09,258	799,850	10,88,085	779,467	10,60,941	440,843	6,00,036
Do., unhusked ...	"	3	4	11,178	15,214	864	1,176	418	562	4,941	6,725	...	...
Other spring crops ...	"	...	...	...	...	...	...	...	...	...	...	...	...
Gums and resins ...	"	...	...	...	...	15	20	1	1	...	...	...	...
Hides and skins—													
Hides of cattle ...	No.	1,080	1,080	551	551	...	...	155	155	222	222	...	...
Skins of sheep, goats, and small animals.	"	11,671	11,671	4,150	4,150	600	660	1,675	1,675	...	...	...	...
Horns	Cwt.	485	660	310	422	396	539	147	200	28	28	32	32
Jewellery, &c.—													
Jewellery	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
Lac—													
Stick and other kinds	Cwt.	537	731	292	397	13	18	19	26	...	...	...	...
Dye	"	...	...	...	...	...	...	...	...	...	...	38	52
Leather—													
Manufactured	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
Liquors	"	...	...	...	...	...	...	...	...	...	...	...	...
Metals and manufactures of metals—													
Brass and copper ...	Cwt.	3	4	16	22	249	349	9	12	...	...	...	...
Iron	"	4	5	...	...	282	384	187	255	...	...	145	197
Other metals	"	...	...	...	...	268	365	12	16	...	...	48	66
Oils	Gals.	2	...	...	...	100	8	...	...	...	...	...	...
Paints and colours ...	Cwt.	1	1	...	...	1	1	1	1	...	...	...	...
Provisions—													
Ghee	lbs.	...	...	...	...	...	...	...	...	...	...	...	...
All other kinds ...	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
Seeds—													
1. Oil-seeds—													
Linseed	Cwt.	126	171	7	10	...	...	...	...	...	...	...	...
Mustard and rape	"	...	...	10	14	104	142	852	1,160	...	...	...	...
Til or gingelly ...	"	1,282	1,744	...	...	...	...	561	764	5,719	7,784	1,411	1,920
Other oil-seeds ...	"	...	...	1,440	1,973	450	613	...	...	...	...	...	...
2. Other seeds—													
Other kinds	"	2	3	...	...	...	...	...	...	...	...	...	...
Silk—													
Raw	lbs.	...	...	...	...	112	1	...	...	...	...	...	...
Manufactured (European).	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
Spices—													
All other kinds ...	lbs.	...	...	...	...	6,968	84	72	1	59,808	666	...	...
Stone and marble ...	Cwt.	1	1	...	...	...	...	...	...	...	...	...	...
Do., Government	"	1	1	...	...	...	...	...	...	...	...	...	...
Tobacco	lbs.	...	...	448	5	...	...	...	...	...	...	...	...
Wood—													
Timber	Cwt.	...	...	1,320	1,797	1,000	1,361	...	...	...	...	...	...
Sleepers	"	12,443	16,936	380	517	...	...	...	...	...	...	...	...
Wool—													
Manufactured (European).	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
All other articles of merchandise—													
Unmanufactured ...	Rs.	...	...	...	...	...	...	...	...	...	...	...	...
Manufactured	"	...	...	...	...	...	...	...	...	...	...	...	...
Do., Government	"	...	...	...	...	...	...	...	...	...	...	...	...
Treasure—													
Silver, Government ...	Rs.	...	...	...	...	...	...	...	...	...	...	...	...

carried by sea during the period 1881-82 *to* 1890-91.

								VALUE.									
1887-88.		1888-89.		1889-90.		1890-91.		1881-82.	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.	1888-89.	1889-90.	1890-91.
English weight.	Indian weight.	English weight.	Indian weight.	English weight.	Indian weight.	English weight.	Indian weight.	Rupees.	Rupees.	Rupees.	Rupees.	Rupees.	Rupees.	Rupees.	Rupees.	Rupees.	Rupees.
	Mds.		Mds.		Mds.		Mds.										
...	...	...	...	...	...	...	...	...	...	50	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	8,232	296	...	...	...	...	...	...
...	...	...	...	...	...	...	...	300	...	777	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	358	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	4,305	35	...	2,000	...	50	784	50
...	...	...	...	...	...	...	...	600	...	40	...	...	...	...	...	...	...
197	268	...	...	57	78	...	...	3,850	7,591	...	...	...	...	904	...	420	...
...	...	...	...	...	...	...	...	1,038	1,307	425	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	36	...	100	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	100	...	...	...	...	...	...
...	...	...	...	330	...	...	...	15	985	8,130	865	...	250	...	...	28	...
...	...	...	...	...	...	...	...	...	...	170	34	...	20	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	340	...	...	75	...	...	...
...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...
2,027	3,636	1,681	2,880	...	...	229	312	8,524	5,437	2,770	7,744	884	12,167	8,518	7,880	...	936
...	...	243	468	498	678	3,098	5,442	7,552	54	6,272	2,146	12,830	22,654	...	1,136	1,017	10,015
388,120	5,28,275	254,580	3,46,513	352,840	4,80,255	720,780	9,81,065	10,22,504	18,08,951	22,39,456	26,19,905	28,86,575	16,48,851	13,52,776	9,51,918	16,22,138	20,79,711
...	...	...	...	...	...	677	981	8	15,214	2,341	1,135	9,942	...	...	...	...	1,383
73	90	...	...	...	...	...	...	...	...	...	...	...	...	250	...	...	...
...	...	...	...	6	8	...	...	...	...	228	10	...	...	...	...	80	...
...	...	5,587	5,587	6,233	...	...	...	2,085	737	...	885	910	...	...	4,400	10,054	...
...	...	...	...	3,750	...	...	...	6,336	1,825	440	1,005	...	...	...	...	3,000	...
12	12	100	136	189	257	429	584	10,177	4,374	6,843	2,177	376	420	175	40	6,194	13,370
...	...	...	...	...	...	...	...	5,310	...	10,080	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	13,289	4,990	91	160	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	360	...	...	...	...
...	...	...	...	...	...	...	...	...	30	...	...	...	200	...	...	...	...
...	...	...	...	...	...	...	...	...	25	...	...	...	...	...	...	...	...
...	...	...	...	...	...	1	1	88	1,070	14,653	315	...	...	...	...	...	150
50	68	239	53	184	250	...	...	30	...	4,423	1,209	...	605	400	200	501	...
...	...	...	...	5	7	...	...	...	...	7,842	142	...	215	...	...	153	...
...	...	...	...	...	...	...	...	12	...	50	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	30	...	48	28	...	...	...	...	...	...
...	...	...	...	3,450	42	...	...	...	...	...	...	...	...	...	...	...	1,880
...	...	...	...	...	...	...	...	330	90	280	...	45	...	20	...	...	...
...	...	...	...	...	...	...	...	450	85	...	...	...	...	...	...	...	...
...	...	256	322	616	838	15	20	...	85	485	4,418	...	...	...	1,449	4,740	50
...	...	702	1,016	3,105	4,226	1,290	1,756	7,104	...	...	2,370	24,585	4,674	...	4,780	18,364	8,378
...	...	...	...	192	261	...	...	...	7,000	2,248	...	...	...	...	...	327	...
...	...	...	...	...	...	...	...	150	...	...	...	...	...	...	...	...	...
6,720	82	196	2	...	...	...	...	...	...	150	...	...	...	4,408	625	...	...
...	...	...	...	...	...	...	...	...	...	220	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	420	140	1,424	...	...	...	...	...
...	...	...	...	...	...	...	...	20	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...
112	1	...	...	28	...	...	...	...	40	...	...	...	...	80	...	50	...
...	...	...	...	2,009	2,735	...	...	...	1,925	3,951	...	...	...	...	...	5,313	...
...	...	...	...	...	...	...	...	42,440	1,547	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	40	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	167	...	1,630	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	14,155	6,328	7,463	2,493	1,993	1,105	1,160	24,781	3,294	610
...	...	...	...	...	...	...	...	2,775	1,319	1,925	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	8,45,000	10,99,500	10,31,777	...	...	...	...	...	...	...

STATEMENT IV.—*Statement showing the traffic upon the canals of the Cuttack District during the five years ending with 1890 (compiled from the reports of the Irrigation Branch of the Department of Public Works).*

		KENDRAPARA CANAL SYSTEM.						HIGH LEVEL CANAL, RANGE I.						TALDANDAH CANAL AND ITS BRANCHES.					
		Total.				Private.		Total.				Private.		Total.				Private.	
		Quantity.			Value.	Quantity.	Value.	Quantity.			Value.	Quantity.	Value.	Quantity.			Value.	Quantity.	Value.
		Up.	Down.	Total.				Up.	Down.	Total.				Up.	Down.	Total.			
		Tons.	Tons.	Tons.	Rs.	Tons.	Rs.	Tons.	Tons.	Tons.	Rs.	Tons.	Rs.	Tons.	Tons.	Tons.	Rs.	Tons.	Rs.
1885-86.	Grain	No up and down trip account was kept during this year; hence these columns are blank.		34,255	16,36,080	34,255	16,36,080	No up and down trip account was kept during this year; hence these columns are blank.		11,901	5,29,400	11,901	5,29,400	...	1,811	1,811	63,614	1,811	63,614
	Cotton			13	700	13	700			135	15,000	135	15,000	...	...	...	...	...	...
	Oil-seeds			487	28,200	487	28,200			158	7,230	158	7,230	...	90	90	5,629	90	6,629
	Salt			1,629	78,750	1,629	78,750			2,473	1,12,350	2,473	1,12,350	...	...	...	...	...	...
	Piece-goods			22	8,500	22	8,500			...	...	...	...	...	...	...	...	...	...
	Metals			15	3,050	15	3,050			2	100	2	100	...	504	504	252	504	252
	Building materials			4,685	3,260	1,101	970			131	660	53	80	...	1,229	1,229	5,240	462	1,377
	Timber			1,259	37,210	1,214	37,060			304	22,530	304	22,530	...	In No. 641	641	1,598	641	1,598
	Bamboos (No. 469,950)			54	5,835	52	5,825			48	320	48	320	...	In No. 103,800	103,800	1,727	103,800	1,727
	Fuel			1,936	4,380	1,929	4,320			949	1,340	949	1,340	...	141	141	395	141	395
	Tobacco			29	2,100	29	2,100			5	500	5	500	...	...	...	...	...	...
	Miscellaneous			18,765	13,67,715	18,472	13,65,485			5,278	2,21,140	5,212	2,20,440	...	263	263	4,790	174	765
	Total ...	...	...	63,149	31,75,780	59,218	31,71,040	...	...	21,384	9,10,570	21,240	9,09,290	Tons... No. ...	4,038 104,441	4,038 104,441	83,245	3,182 104,441	75,357
1886-87.	Grain	3,652	7,373	11,025	7,21,030	11,025	7,21,030	3,303	172	3,475	1,82,145	3,475	1,82,145	...	1,008	1,006	24,673	1,008	24,673
	Cotton	...	4	4	1,000	4	1,000	...	61	61	15.900	61	15,900	...	...	...	...	...	...
	Oil-seeds	540	1,832	2,372	2,62,990	2,372	2,62,990	196	35	231	16,740	231	16,740	...	85	85	7,122	85	7,122
	Salt	501	589	1,090	87,060	1,090	87,060	5	1,657	1,662	93,530	1,662	93,530	...	...	...	...	...	...
	Piece-goods	...	...	...	...	...	...	...	2	2	500	2	500	...	...	...	...	...	...
	Metals	5	2	7	6,050	7	6,050	3	1	4	1,050	4	1,050	...	1,038¾	1,038¾	897	1,038¾	897
	Building materials	401	2,226	2,627	26,955	1,024	17,835	164	1,024	1.188	4,470	221	4,000	...	2,239¼	2,239¼	5,275	70½	337
	Miscellaneous	15,857	6,960	22,817	19,34,230	21,433	19,28,130	3,214	2,911	6.125	2,75,470	5,925	2,75,270	38½	238½	277	15,405	245	6,375
	Fuel	704	26	730	4,120	713	4,080	1,037	...	1,037	2,800	1,037	2,800	...	79	79	350	79	350
	Timber	64	...	64	31,730	64	31,730	13	...	13	32,720	13	32,720	...	...	...	1,902	...	1,902
	Bamboos ... No.	...	...	...	5,015	...	5,015	...	...	...	180	...	180	...	...	...	2,298	...	2,298
	Ditto ... Tons	...	...	...	...	...	...	...	...	...	...	...	...	...	13	13	59	13	50
	Total ...	21,724	19,012	40,736	30,80,190	37,732	30,64.920	7,935	5,863	13,798	6,25,505	12,631	6,24,835	38½	4,702	4,740½	57,972	2,539	43,004
1887-88.	Grain	5,545	7,037	12,582	7,89,340	12,582	7,87,840	3,990	12	7,002	2,76,750	4,002	2,76,750	...	1,908½	1,908½	40,792	1,908½	40,792
	Cotton	...	14	14	3,700	14	3,700	...	77	77	15,300	77	15,300	...	...	...	...	...	...
	Oil-seeds	53	1,061	1,114	1,23,190	1,114	1,23,190	69	...	69	6,190	69	6,190	...	142	142	11,947	142	11,947
	Salt	787	577	1,364	1,45,210	1,364	1,45,210	...	1,875	1,875	1,56,680	1.875	1,56,680	...	...	...	...	...	...
	Piece-goods	12	...	12	5,500	12	5,500	...	...	...	...	...	...	...	...	...	...	...	...
	Metals	...	...	...	...	...	...	20	...	20	2.870	20	2,870	...	2,799	2,799	3,455	2,799	3,455
	Building materials	882	6,304	7,186	57,330	2,308	41,940	677	1,199	1.876	8,410	683	7,570	...	10,990	10,990	16,042	5,884¾	7,726
	Miscellaneous	7,222	4,221	11,413	24,43,440	11,065	24,35,380	2,129	1,305	3,434	3,16,840	3,434	3,16,840	6	391½	397½	20,745	397½	20,745
	Fuel	422	40	462	2,940	442	2,790	1,952	...	1,952	5.460	1,952	5,460	...	129¾	129¾	625	129¾	625
	Timber	2	183	185	34,340	185	34,340	...	68	68	37,260	68	37,260	...	21	21	2,417	21	2,417
	Bamboos ... No.	...	...	...	6,435	...	6,390	...	...	...	740	...	740	...	...	...	2,642	...	2,642
	Total ...	14,925	19,437	34,362	1,36,11,925	29,176	35,88,280	8,837	4,536	13,373	8,26,500	12,180	8,25,660	6	16,381¼	16,387¼	96,665	11,282¾	90,349

STATEMENT IV.—*Statement showing the traffic upon the canals of the Cuttack District during the five years ending with* 1890 (*compiled from the reports of the Irrigation Branch of the Department of Public Works*)—continued.

		HIGH LEVEL CANAL, RANGE II.						JAJPUR CANAL.						GRAND TOTAL.					
		Total.				Private.		Total.				Private.		Total.				Private.	
		Quantity.			Value.	Quantity.	Value.	Quantity.			Value.	Quantity.	Value.	Quantity.			Value.	Quantity.	Value.
		Up.	Down.	Total.				Up.	Down.	Total.				Up.	Down.	Total.			
		Tons.	Tons.	Tons.	Rs.	Tons.	Rs.	Tons.	Tons.	Tons.	Rs.	Tons.	Rs.	Tons.	Tons.	Tons.	Rs.	Tons.	Rs.
1885-86—contd.	Grain	No up and down trip account was kept during the year; hence these columns are blank.		7,023	2,31,789	7,023	2,31,789	...	...	...	...	...	...	...	1,811	54,990	24,60,883	54,990	24,60,883
	Cotton			30	4,655	30	4,655	...	...	...	...	...	...	...	...	178	20,355	178	20,355
	Oil-seeds			371	20,902	371	20,902	...	...	...	...	...	...	...	90	1,104	61,961	1,106	61,961
	Salt			696	45,345	696	45,345	...	...	...	...	...	...	...	...	4,798	2,36,445	4,798	2,36,445
	Piece-goods			...	...	...	...	...	...	...	...	...	...	...	...	22	8,500	22	8,500
	Metals			20	2,790	20	2,790	...	...	...	...	...	...	...	504	541	6,192	91	6,192
	Building materials			3,547	1,213	66	633	...	...	...	...	...	...	...	1,229	9,592	10,373	1,682	3,060
	Timber			328	1,633	308	1,575	...	...	...	...	...	...	...	641	2,532	63,971	2,467	62,763
	Bamboos (No. 469,950)			118	16	118	16	...	...	...	...	...	...	...	103,800	104,020	7,898	104,018	7,898
	Fuel			2,146	2,362	10	14	...	...	...	...	...	...	...	141	5,172	8,477	3,029	6,069
	Tobacco			12	1,288	12	1,288	...	...	...	...	...	...	...	...	46	3,888	46	3,888
	Miscellaneous			5,733	37,633	3,008	37,633	...	...	...	...	...	...	...	263	30,039	16,31,278	26,866	16,24,323
	Total ...	...	...	12,578 448	3,49,626	11,236 426	3,46,640	... ...	... ...	... ...	...	... ...	...	Tons Nos.	4,038 104,441	108,149 104,887	45,19,221	94,876 104,867	45,02,327
1886-87—contd.	Grain	683	2,190	2,873	98,712	2,873	88,712	...	...	...	...	...	...	7,638	10,743	18,381	1,01,659	18,381	10,16,560
	Cotton	43	7	50	7,157	50	7,157	...	...	...	...	...	...	43	72	115	24,057	115	24,057
	Oil-seeds	563	70½	633½	37,659	633	37,659	...	...	...	...	...	...	1,299	2,022½	3,321½	3,24,511	3,321	3,24,511
	Salt	344	36	380	31,805	380	31,805	...	...	...	...	...	...	850	2,282	3,132	2,12,395	3,152	2,12,395
	Piece-goods	304	45½	349½	56,290	349	56,290	...	...	...	...	...	...	304	47½	351½	56,790	351	56,790
	Metals	21	9	30	...	17	...	...	...	...	...	...	...	29	1,050¾	1,079¾	7,997	1,066¾	7,997
	Building materials	5,138	1,232½	6,370½	2,820	29	590	...	...	...	...	...	...	5,703	6,722½	12,425½	39,520	1,344¼	22,762
	Miscellaneous	3,153½	2,002	5,155½	78,820	2,492	74,855	...	...	...	...	...	...	22,263	12,111½	34,374½	23,03,925	30,095	22,88,630
	Fuel	730	199½	929½	11,742	1	3	...	...	...	...	...	...	2,471	304½	2,775½	19,012	1,830	7,233
	Timber	16	...	16	16,144	8	13,318	...	...	...	...	...	...	93	...	93	82,496	85	79,670
	Bamboos ... No.	18	...	18	963	18	963	...	...	...	...	...	...	18	...	18	8,456	18	8,456
	Ditto ... Tons	...	...	...	...	...	...	...	...	...	...	...	...	...	13	13	50	13	50
	Total ...	11,013½	5,792	16,805½	3,32,112	6,850	3,11,352	...	...	...	...	...	...	40,711	35,369	76,080	40,95,769	59,752	40,44,111
1887-88—contd.	Grain	1,855½	107½	1,963	96,364	1,963	96,364	...	...	...	...	...	...	11,390½	9,065	20,455½	12,03,746	20,455½	12,03,746
	Cotton	4	6½	10½	3,280	10½	3,280	...	...	...	...	...	...	4	97½	101½	22,280	101½	22,280
	Oil-seeds	9½	498½	508	43,115	508	43,115	...	...	...	...	...	...	131½	1,701½	1,833	1,84,442	1,833	1,84,442
	Salt	8	393½	401½	54,832	401½	54,832	...	...	...	...	...	...	795	2,845½	3,640½	3,56,722	3,640½	3,56,722
	Piece-goods	½	248½	249	70,650	249	70,650	...	...	...	...	...	...	12½	248½	261	76,150	261	76,150
	Metals	4½	12	16½	1,950	16½	1,950	...	...	...	...	...	...	24½	2,811	2,835½	8,275	2,835½	8,275
	Building materials	69	4,682	4,751	5,198	29	1,653	...	...	...	...	...	...	1,628	23,175	24,803	86,950	8,994¾	58,989
	Miscellaneous	41½	510½	552	76,128	241½	75,412	...	...	...	...	...	...	9,398½	6,428	15,826½	28,57,153	15,438	28,48,377
	Fuel ...	...	135¾	135¾	387	8¾	27	...	...	...	...	...	...	2,374	304$\frac{11}{12}$	2,678$\frac{11}{12}$	9,412	2,531$\frac{11}{12}$	8,902
	Timber	...	...	...	17,085	...	16,805	...	...	...	...	...	...	2	272	274	91,102	274	90,822
	Bamboos ... No.	...	...	...	2,503	...	2,503	...	...	...	...	...	...	...	...	...	12,320	...	12,275
	Total ...	1,992½	6,594¾	8,586$\frac{5}{14}$	3,71,492	3,727¾	3,66,591	...	...	...	...	...	...	25,760½	46,948$\frac{2}{3}$	72,709$\frac{1}{6}$	49,06,582	56,365$\frac{5}{7}$	46,70,880

STATEMENT IV.—*Statement showing the traffic upon the canals of the Cuttack District during the five years ending with* 1890 (*compiled from the reports of the Irrigation Branch of the Department of Public Works*)—continued.

			KENDRAPARA CANAL SYSTEM.						HIGH LEVEL CANAL, RANGE I.						TALDANDAH CANAL AND ITS BRANCHES.					
			Total.				Private.		Total.				Private.		Total.				Private.	
			Quantity.			Value.	Quantity.	Value.	Quantity.			Value.	Quantity.	Value.	Quantity.			Value.	Quantity.	Value.
			Up.	Down.	Total.				Up.	Down.	Total.				Up.	Down.	Total.			
			Tons.	Tons.	Tons.	Rs.	Tons.	Rs.	Tons.	Tons.	Tons.	Rs.	Tons.	Rs.	Tons.	Tons.	Tons.	Rs.	Tons.	Rs.
1888-89.	Grain ...	...	6,597	6,183	12,780	7,32,560	12,780	7,32,560	4,188	2	4,190	2,58,030	4,190	2,58,030	291	1,424	1,715	56,305	1,715	56,305
	Cotton ...	...	..	20	20	5,700	20	5,700	...	22	22	4,840	22	4,840	...	...	...	...	...	...
	Oil-seeds ...	...	72	890	962	1,06,590	962	1,06,590	300	6	306	24,500	306	24,500	..	71	71	5,555	71	5,555
	Salt ...	...	300	440	740	66,380	740	66,380	...	1,058	1,058	88,970	1,058	88,970	...	12	12	715	12	715
	Piece-goods ...	...	...	2	2	600	2	600	...	...	...	...	...	...	...	...	...	...	...	...
	Metals ...	...	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...
	Building materials ...	...	105	6,645	6,750	1,04,665	4,334	92,625	757	1,944	2,701	6,890	776	5,570	1	8,102	8,103	10,810	6,579	7,843
	Miscellaneous ...	...	6,214	5,579	11,793	23,74,235	11,778	23,71,805	958	1,099	2,057	2,28,750	2,057	2,28,750	26	193	219	24,009	218	22,909
	Fuel ...	...	305	71	376	1,340	367	1,270	1,331	...	1,331	3,820	1,331	3,820	...	93	93	605	93	606
	Timber ...	C. ft.	...	...	..	...	...	...	...	...	..	...	.	..	...	...	...	...	...	...
		No.	...	9,735	9,735	18,740	9,735	18,740	5,998	...	5,998	11,900	5,998	11,900	...	1,084	1,084	2,185	1,084	2,185
	Bamboos ...	No.	...	515,570	515,570	8,140	515,570	8,140	1,450	24,700	26,150	940	26,150	940	...	123,200	123,200	1,926	123,200	1,928
	Total: Tons and value ...	...	13,593	19,830	33,423	34,18,950	30,983	34,06,410	7,534	4,131	11,665	6,28,530	9,740	6,27,280	318	9,895	10,213	1,02,110	8,688	98,043
	Total: Bamboos No. ...	...	...	515,570	515,570	...	515,570	...	1,450	21,700	26,150	...	26,150	...	...	123,200	123,200	...	123,200	...
	Total: Timber ...	C. ft.	...	..	..	...	..	...	...	...	..	...	.	...	...	...	..	..	..	...
		No.	..	9,735	9,735	...	9,735	...	5,998	...	5,998	..	5,998	...	...	1,084	1,084	...	1,084	...
1889-90.	Grain ...	...	6,706	12,824	19,530	12,92,060	19,530	12,92,060	4,726	18	4,744	2,74,570	4,744	2,74,570	438	1,207	1,645	89,512	1,645	89,512
	Cotton ...	...	52	35	87	24,050	87	24,050	18	80	98	26,550	98	26,550	...	...	...	...	...	...
	Oil-seeds ...	...	51	824	875	1,19,020	875	1,19,020	517	4	521	43,480	521	43,480	...	30	30	2,526	30	2,626
	Salt ...	...	406	436	842	78,930	842	78,930	...	1,369	1,369	1,14,950	1,369	1,14,950	...	147	147	15,080	147	15,080
	Piece-goods ...	...	139	46	185	1,54,800	185	1,54,800	...	...	...	...	...	...	...	...	...	...	...	...
	Metals ...	...	3	...	3	700	3	700	5	...	5	740	5	740	...	...	...	...	...	...
	Building materials ...	...	131	7,267	7,398	1,12,400	3,914	96,270	830	2,049	2,879	8,980	897	7,320	11	8,369	8,380	16,057	6,139	7,139
	Miscellaneous ...	...	6,456	4,396	10,852	17,34,110	10,833	17,25,010	1,158	766	1,924	2,19,600	1,924	2,19,600	22	225	247	24,075	225	16,975
	Fuel ...	...	343	31	374	2,180	374	2,180	895	...	895	2,380	841	2,380	...	149	149	672	149	672
	Timber ...	No.	119	1,717	1,836	22,075	1,836	22,075	1,610	...	1,610	24,350	1,610	24,350	...	807	807	1,243	807	1,243
		C. ft.	126	44,976	45,102		45,102		72,288	138	72,426		72,426		...	...	...	...	...	...
	Bamboos ...	No.	...	129,045	129,045	14,205	129,045	14,205	20,025	6,000	26,035	2,140	26,035	2,140	...	143,000	143,000	2,270	143,000	2,270
		C. ft.	...	106,620	106,620		106,620		2,700	13,849	16,549		16,549		...	...	...	...	..	...
	Total ...		14,287	25,859	40,146	35,18,250	36,643	34,93,020	8,149	4,286	12,435	6,91,390	10,389	6,89,590	471	10,127	10,598	1,47,922	8,335	1,31,904
	Timber 1=6 c. ft. ...	...	840	55,278	56,118	22,075	56,118	22,075	81,948	138	82,086	24,350	82,086	24,350	...	4,842	4,842	1,243	4,842	1,243
	Bamboo 4=1 ,, ...	...	...	138,881	138,881	14,205	138,881	14,205	7,706	15,349	23,055	2,140	23,055	2,140	...	35,750	35,750	2,270	35,750	2,270

STATEMENT IV.—*Statement showing the traffic upon the canals of the Cuttack District during the five years ending with* 1890 (*compiled from the reports of the Irrigation Branch of the Department of Public Works*)—concluded.

		High Level Canal, Range II.						Jajpur Canal.						Grand Total.					
		Total.				Private.		Total.				Private.		Total.				Private.	
		Quantity.			Value.	Quantity.	Value.	Quantity.			Value.	Quantity.	Value.	Quantity.			Value.	Quantity.	Value.
		Up.	Down.	Total.				Up.	Down.	Total.				Up.	Down.	Total.			
		Tons.	Tons.	Tons.	Rs.	Tons.	Rs.	Tons.	Tons.	Tons.	Rs.	Tons.	Rs.	Tons.	Tons.	Tons.	Rs.	Tons.	Rs.
1888-89—*concld.*	Grain ...	2,432	34	2,466	1,06,907	2,466	1,06,907	9	11	20	931	20	931	13,517	7,654	21,171	11,54,733	21,171	11,54,733
	Cotton	1¼	5¾	7	680	7	680	...	3	3	158	3	158	1½	50½	52	11,318	52	11,838
	Oil-seeds	3	260½	263½	22,106	263½	22 106	26½	39	65½	6,194	65½	6,194	401½	1,266½	1,668	1,64,945	1,668	1,64,945
	Salt ...	4	197½	201½	28,247	201½	28,247	...	...	...	...	...	...	304	1,707½	2,011½	1,84,312	110	1,84,312
	Piece-goods ...	18	341	359	54.103	359	54.103	6½	1	7½	2,270	7½	2,270	24½	344	368½	56,973	369	56,973
	Metals	2	...	2	1.240	2	1,240	...	...	...	...	...	...	2	...	2	1,240	2	1,240
	Building materials	20	4,080	4,100	5,701	95	2,555	154½	8½	173	532	33	374	1.037½	20,779½	21,817	1,28,528	11,817	1,06,967
	Miscellaneous	40	457½	497½	63,228	487½	62,664	38½	13	51½	10,202	51½	10,202	7,276½	7,341½	14,618	27,00,424	14.592	26,98,330
	Fuel ...	...	409½	409½	2,647	163	279	4	8	12	208	12	208	1,640	581½	2,221½	8,620	1,166	6,152
	Timber ... C. ft.	96	12,558	12,654	...	12,654	...	6,960	5,940	12,900	...	12,900	...	7,056	18,488	25.554	...	25,554	...
	Timber ... No.	21	951	972	8,620	949	7,987	696	...	696	3,278	696	3,278	6,715	11 770	18.485	44,133	18,462	44,090
	Bamboos ... No.	...	84,666	84,666	3.413	84,666	3,013	...	9,600	9,600	230	9,600	230	1,450	757,736	7,59,186	14,249	759,186	14,249
Total	Tons and value ...	2,520½	5,785½	8,306	2,95,892	4,044½	2,89,781	239	83½	322½	24,003	192½	23,845	24,204½	39.725	63,929½	44,69,485	53,648	44,45,359
	Bamboos ... No.	...	84,666	84,666	...	84,666	...	...	9,600	9,600	...	9,600	...	1,450	757,736	759,186	...	7,600.410	...
	Timber ... C. ft.	96	12,558	12,654	...	12,654	...	6,960	5,940	12,900	...	12,900	...	5,056	18,498	23.554	...	25,554	...
	Timber ... No.	21	951	972	...	349	...	696	...	696	...	696	...	6,715	11,770	18,485	...	18,462	...
1889-90—*concld.*	Grain ...	2,169	46	2,215	1,00,051	2,137	95,689	12½	26½	39	1,483	39	1,483	14,051½	14,121½	28,173	17,57,676	28,095	17,53,514
	Cotton	8½	11	19½	2,627	19½	2,627	...	2½	2½	700	2½	700	78½	128½	207	53,927	207	53,927
	Oil-seeds	4	133½	137½	9,790	136½	9,790	...	15½	15½	4,255	15½	4,255	572	1,007	1,579	1,79,072	1,578	1,79,071
	Salt ...	12	170	182	24,338	182	24,338	12½	...	12½	1,020	12½	1,020	430½	2,122	2,552½	2.34,318	2,552½	2,34,318
	Piece-goods ...	...	179	179	49,420	179	49,420	...	12	12	4,300	12	4,300	139	237	376	2,08,520	376	2,08,520
	Metals	3	5	8	488	3	260	...	...	...	...	...	...	11	5	16	1,928	11	1,700
	Building materials	38	3,000	3,038	3,441	15	518	...	...	...	...	...	...	1,010	20,685	21,695	1,40,878	10,965	1,11,247
	Miscellaneous	214½	558½	773	62,618	761	62,514	...	215½	215½	24,830	215½	24,830	7,850½	6,161	14,011½	20,65,233	13,958½	20,48,929
	Fuel ...	...	739½	739½	2,077	229	661	8	30½	38½	268	30½	212	1,246	949	2,195	7,717	1,623½	6,106
	Timber ... No.	66	1	67	16,987	67	16,796	...	...	...	3,011	...	3,011						
	Timber ... C. ft.	222	41,670	41,892		31,896		...	24,072	24,072		24,072							
	Bamboos ... No.	...	109,418	109,418	3,279	109,418	3,279	...	27,500	27,500	898	27,500	898						
	Bamboos ... C. ft.	...	...	...		...		...	...	...		...							
	Total ...	2,449	4,841½	7,290½	2,54,850	3,662	2,45,617	33	302½	335½	36,856	327½	36,900	25,389	45,416	70,805	46,49,268	59,356½	45,97,131
	Timber 1=6 c. ft. ...	618	41,676	42,294	16,987	32,298	16,796	...	24,072	24,072	3,011	24,072	3,011						
	Bamboo 4=1 ,, ...	...	27,355	27,355	3,279	27,355	3,279	...	6,875	6,875	898	6,875	898						

STATEMENT V—*Statement showing the boat traffic of Cuttack passing by the Orissa Coast Canal for six years from* 1886-87 *to* 1891-92.

[A portion of the canal was opened for trade in July 1885, but it does not appear from the Trade Reports of the Government of Bengal that any of the traffic of the Cuttack district passed along this route for the first nine months.]

	1886-87.	1887-88.	1888-89.	1889-90.	1890-91.	1891-92.
	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.
Imports ...	100	3,337	23,210	12,327	15,065	38,410
Exports ...	50	12,447	4,385	2,785	2,225	2,630

Registration of Traffic.—In order to collect statistics in connection with the proposed railway to Orissa, two stations were established under the orders of Government No. 1519R., dated the 22nd April 1882, for the purpose of registering the traffic passing on the Sambalpur road and by the Mahanadi river between the towns of Cuttack and Sambalpur. The statistic then obtained are given in the following statements:—

STATEMENT VI—*Statement of Trade Statistics by river at Cuttack and Barmul from July* 1882 *to February* 1883.

DESCRIPTION OF TRAFFIC.		Cuttack.	Barmul.	DESCRIPTION OF TRAFFIC.		Cuttack.	Barmul.
Boats ..	... No.	3,801	4,900	Wax ...	... Mds.	490	...
Rafts ...	... "	526	268	Catechu	... "	1,720	60
Passengers	... "	27,664	10,712	Masur	... "	...	300
Rice ...	... Mds.	1,77,625	1,96,556$\frac{1}{10}$	Glass ...	... "	...	3
Paddy ...	... "	46,718	$\frac{2}{5}$	Palanquin and horse	No.	...	16
Fuel ...	... "	1,39,618	230	Hides ...	... "	1,168	50
Wheat ...	... "	17,627½	10,297$\frac{9}{40}$	Tobacco leaf	... Mds.	2,128	...
Oats ...	... "	5,070	2,391⅛	Spices ...	... "	1,148	66⅜
Green grain (muga)	"	12,398	9,372	Miscellaneous	... "	...	1,36,353
Black grain (birhi)	"	5,200	......	Tiles ...	... No.	...	4,500
Horse gram (kulthi)	"	4 419	1,100	Tents ...	... "	...	2
Tilseed	... "	16,942	13,614½	Paper ...	... Mds.	...	850
Castor seed	... "	8,840¾	10,041⅛	Boxes ...	... "	...	119
Ghi ...	.. "	1,066	873½	Kalajira	... "	...	310
Chana ...	... "	7,256	5,975½	Utensils	... No.	200	560$\frac{3}{10}$
Arhar ..	... "	2,740	205	Provisions	... Mds.	...	1,139$\frac{11}{40}$
Oilcake	... "	6,495	1,219⅛	Milk, curdled milk	"	...	43⅛
Molasses	... "	14,079	2,527$\frac{21}{40}$	Straw ..	... Bharan.	...	1
Jute ...	... "	700	5	Moril ...	... Mds.	...	200
Horns ...	.. No.	1,360	5,520	Oil ...	... "	...	292¾
Linseed	. "	3,130	2,167½	Dhania ...	... "	...	40
Turmeric	.. Mds.	3,242	4,355⅝	Umbrellas	... No.	...	30
Tamarind	. "	1,210¼	......	Harrida	... Mds.	...	150
Onions ...	.. "	100	......	Ginger ...	... "	...	45
Timber ...	... No.	37,087	29,950	Dry fish	... "	...	172
Bamboo	... "	1,351,990	420,500	Silver, cash	... "	5,00,000	...
Lac ...	. "	460	317	Gunny ..	... No.	100	1,340
Mustard	... Mds.	2,230	720⅝	Silk-worms	... "	...	2,44,282
Cotton ...	... "	1,220	316$\frac{3}{20}$	Crackers	... "	...	1,000
Lime ...	... "	4,695	340	Arkhi seed	... Mds.	...	35
Salt ...	.. "	50,339¾	48,232	Chillies	... "	...	6
Twist ...	... Bales.	1,445	1,610	Animals	... No.	...	2
Cloth ...	.. "	778	1,695	Leaf ...	... Mds.	...	30,500
Zinc ...	... Mds.	4,082	69	Fruits ...	... "	...	427
Copper ...	... "	4,050¾	175	Khasari	... "	...	37½
Betelnut	. Bags.	2,806	201	Metals ...	... "	108	50
Cocoanut	.. No.	807,969	3,691,618	Odora ...	... No.	160	...
Castor oil	... Mds.	80	......	Limestone	... Mds.	100	...
Iron ...	... "	850	120	Fibres ...	... "	400	...

STATEMENT VII.—*Statement of Trade Statistics on the Sambalpur Road from July* 1882 *to February* 1883.

Description of traffic.			Description of traffic		
Foot passengers	No	37,723	Idols and their apparatus	Mds	$3\frac{1}{10}$
Passengers on horse, cart, &c	"	679	Miscellaneous	"	$52\frac{1}{5}$
Horses	"	773	Chana and maize	"	$9\frac{21}{40}$
Carts	"	5,980	Country wine	"	3_{8}
Oxen and cows	"	2,049	Turmeric	"	$46\frac{3}{10}$
Buffaloes and camels	"	103	Ropes	"	35
Palanquins	"	9	Lime	"	$13\frac{1}{2}$
Dulis	"	3	Horse gram (kulthi)	Md.	$\frac{1}{8}$
Dogs and apes	"	27	Husk	Mds	$9,742\frac{7}{8}$
Goats	"	12	Paper	"	$3\frac{1}{2}$
Peacocks	"	2	Hides { Bundles	"	32,499
Parrots	"	8	Hides { Bales	"	8,508
Burdens	"	15,316	Small trees	No.	28
Bhars	"	4,337	Asses	"	27
Earthen pots	"	295	Dried fish	Md	$\frac{1}{2}$
Baskets, boxes, and plates	"	97	Lanterns	No.	2
Betel-leaf	"	17,500	Banners	"	2
Palm-fruit	"	83	Twist	"	12
Cloth { Bundles	"	$47\frac{3}{4}$	Silk-worms	"	51,960
Cloth { Bales	"	71	Traps for catching birds	"	20
Provisions	Mds	$2,740\frac{21}{40}$	Water of the Ganges	Md	$\frac{1}{2}$
Cotton	"	$268\frac{7}{8}$	Gunny	No.	56
Salt	"	$37,529\frac{3}{8}$	Blankets	"	100
Horns	"	$5,439\frac{3}{4}$	Ornaments	Md.	$\frac{1}{4}$
Paddy	"	$31\frac{7}{20}$	Fancy goods	Mds.	$2\frac{1}{2}$
Rice	"	$344\frac{1}{5}$	Tents	No	5
Milk, curdled milk, &c.	"	$19\frac{3}{8}$	Timber	"	58
Vegetables	"	$377\frac{18}{40}$	Cocoanuts	"	344,816
Utensils	"	$51\frac{5}{8}$	Camels	"	3
Green grain (muga)	"	$12\frac{1}{2}$	Shoes	"	40
Oil	"	$14\frac{7}{10}$	Books	"	42
Iron	Md.	$\frac{7}{8}$	Oilcake	Mds.	120
Betelnut	Mds	$9\frac{9}{10}$	Pictures	No.	4
Tobacco leaf	"	$4\frac{13}{20}$	Plantain	"	371
Spices	"	$6,464\frac{4}{5}$	Bird	"	1
Castor, tilseed, and linseed	"	$76,990\frac{11}{20}$	Straw	"	3,000
Sheep	No.	3	Onions	Md.	$\frac{19}{20}$
Palm-leaf umbrella	"	68	Arhar	Mds.	136
Guns, swords, &c.	"	252	Wheat	"	$2,463\frac{1}{8}$
Musical instruments	"	30	Attar	Masas	200
Black grain (birhi)	Mds.	$2\frac{7}{8}$	Tamarind	Mds.	4
Molasses	"	$17\frac{3}{40}$	Mustard seed	"	24
Gunpowder and bullets	"	$2,400\frac{1}{10}$	Glass	"	4
Instruments	No.	$59\frac{7}{8}$	Bags	No.	4,174

APPENDIX XII.

STATISTICS OF MANUFACTURES.

The only manufacture of the district, excluding jail manufactures, of which statistics are available is that of salt. The statement given below shows the manufacture, import, sale, and stock of salt in the Cuttack district for ten years from 1878-79 to 1887-88. In the following year, the manufacture of salt was abolished, and the management of the Salt Department transferred to the Madras Presidency:—

	1878-79.	1879-80.	1880-81.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.
	Mds. s. c.	Mds. s. c.	Mds. s. c.	Mds. s. c.	Mds. s. c.	Mds. s. c.	Mds. s. c.	Mds. s. c.	Mds. s. c.	Mds. s. c.
Stock of salt at the commencement of the year	6,111 5 0	14,970 10 0	30,588 35 0	43,994 0 0	61,736 37 0	63,865 24 0	40,474 30 0	35,167 35 0	35,664 25 0	27,438 20 0
Total quantity imported and manufactured during the year, including surplus ...	27,653 8 0	59,179 5 0	59,159 4 0	92,907 23 0	67,352 36 0	54,934 35 0	57,230 10 0	46 224 30 0	24,728 6 0	12,202 21 0
Total ...	33,764 13 0	74,149 15 0	89,747 39 0	1,36,901 23 0	1,29,089 33 0	118,800 19 0	97,705 0 0	81,392 25 0	60,392 31 0	39,641 1 0
Deduct transferred to other districts	...	...	...	...	...	...	...	...	...	...
Balance ...	33,764 13 0	74,149 15 0	89,747 39 0	1,36,901 23 0	1,29,089 33 0	...	97,705 0 0	81,392 25 0	60,392 31 0	39,641 1 0
Add transferred from other districts	...	...	...	...	...	...	...	...	...	...
Total ...	33,764 13 0	74,149 15 0	89,747 39 0	1,36,901 23 0	1,29,089 33 0	...	97,705 0 0	81,392 25 0	60,392 31 0	39,641 1 0
Quantities sold or on which duty was paid during the year	18,446 15 0	42,293 5 0	44,397 0 8	73,362 17 8	61,873 38 0	...	56,401 15 0	41,012 10 0	27,771 20 0	33,047 35 0
Balance ...	15,317 38 0	31,856 10 0	45,350 30 0	63,539 5 8	67,215 35 0	...	41,303 25 0	40,380 15 0	32,621 11 0	6,593 6 0
Quantity written off during year on account of wastage	173 20 0	644 37 0	918 25 0	1,170 12 8	3,350 11 0	...	*6,135 30 0	4,715 30 0	5,182 31 0	91 30 0
Balance ...	15,144 18 0	31,211 13 0	44,432 14 0	62,368 33 0	63,865 24 0	...	35,167 35 0	35,664 25 0	27,438 20 0	6,501 16 0
Deduct quantity given to fish contractor	...	...	...	...	...	...	...	...	...	...
Balance ...	15,144 18 0	31,211 13 0	44,432 14 0	62,368 33 0	63,865 24 0	...	35,167 35 0	35,664 25 0	27,438 20 0	6,501 16 0
Deduct quantity found deficient on weighment at golah during the year ...	174 8 0	622 18 0	438 14 0	631 36 0	...	...	...	...	...	2,044 36 0
Balance ...	14,970 10 0	30,588 35 0	43,994 0 0	61,736 37 0	63,865 24 0	...	35,167 35 0	35,664 25 0	27,438 20 0	4,456 20 0

* *N.B.*—For the years 1884 to 1887 no separate figures could be obtained from the Commissioner's reports on the quantity deficient on weighment at golah. The figures for wastage evidently include this for these three years.

APPENDIX XIII.

REEVNUE STATISTICS.

The comparative statement below shows the demands, collections, remissions and balances of land revenue for the period 1880-81 to 1890 91 :—

STATEMENT I.

YEAR.	Number of estates.	Demands.	Collections.	Remissions.	Balance
		Rs.	Rs.	Rs.	Rs.
1880-81 ...	3,836	10,08,461	9,88,412	1,873	18,176
1881-82 ...	3,842	9,00,907	8,83,639	1,232	16,036
1882-83 ...	3,863	8,99,754	8,74,819	16,510	8,425
1883-84 ...	3,883	8,96,990	8,85,957	1,420	9,613
1884-85 ...	3,913	8,93,140	8,78,925	43	14,172
1885-86 ...	3,914	8,97,663	8,77,432	5,201	15,030
1886-87 ...	3 915	8,98,592	8,85,175	4,238	9,179
1887-88 ...	3,926	8,93,074	8,85,975	1,316	5,783
1888-89 ...	3,958	8,89,221	8,71,661	2,433	15,127
1889-90 ...	4,056	9,03,082	8,80,255	5,253	17,574
1890-91 ...	4,098	9,06,246	8,87,446	1,458	17,342

Statement II is a comparative statement showing the excise revenue, including opium, for the period 1880-81 to 1890-91 as compared with the average of preceding five years —

STATEMENT II.

YEARS.	Opium.	Excise.	Total.
	Rs.	Rs.	Rs.
Average revenue of 5 years preceding 1880-81.	92,833	63,406	1,56,239
1880-81 ...	1,12,717	68,269	1,80,986
1881-82 ...	1,20,887	78,836	1,99,723
1882-83 ...	1,25,651	95.131	2,20,782
1883-84 ..	1,36.466	95,922	2,32,388
1884-85 ...	1,39,209	99,378	2,38,587
1885-86 ..	1,39,006	98,237	2,37,243
1886-87 ...	1,45,972	92,883	2,38,855
1887-88 ...	1,45,787	95,122	2,40,909
1888-89 ...	1,38,175	99,252	2,37,427
1889-90 ..	1,41,924	94,506	2,36,430
1890-91 ...	1,36,104	98,186	2,34,290

Statement III shows the receipts from the sale of stamps of all descriptions, with the exception of ordinary postage, service and telegraph stamps, for the years 1880-81 to 1890-91 :—

STATEMENT III.

YEARS.	Receipts.
	Rs.
1880-81	1,57,767
1881-82	1,67,376
1882-83	1,50,940
1883-84	1,66,746
1884-85	1,67,571
1885-86	1,82,323
1886-87	2,06,982
1887-88	2,09,505
1888-89	1,89,140
1889-90	1,98,515
1890-91	2,01,702

Statement IV shows the revenue from Income-tax since its introduction in the year 1886-87 to the year 1890-91:—

STATEMENT IV.

YEARS.	Revenue.
	Rs.
1886-87	26,409
1887-88	25,745
1888-89	21,359
1889-90	20,903
1890-91	21,015

APPENDIX XIV.

JAIL STATISTICS.

Statement I.—Showing particulars regarding prisoners under trial in the Cuttack Jail during the years 1881—91.

Years.	Number remaining at the close of previous year.		Number received during the year.		Total.			Daily average number.		
	M.	F.	M.	F.	M.	F.	Total.	M.	F.	Total.
1881	16	2	365	33	381	35	416	15·58	1·52	17·10
1882	16	1	348	32	364	33	397	15·77	1·32	17·09
1883	6	1	262	19	268	20	288	11·86	0·74	12·60
1884	12	2	318	15	330	17	347	14·88	0·76	15·64
1885	23	...	297	14	320	14	334	17·35	0·75	18·10
1886	12	...	266	15	278	15	293	11·90	0·48	12·38
1887	13	2	349	12	362	14	376	21·55	0·88	22·43
1888	14	1	488	24	502	25	527	24·46	1·51	25·97
1889	43	2	428	25	471	27	498	20·56	1·75	22·31
1890	32	1	450	19	482	20	502	24·77	0·82	25·59
1891	47	4	447	14	494	18	512	26·51	0·63	27·14

Years.	Released.			Convicted and sentenced.			Transferred.		Escaped.		Died.		Remaining on the 31st December.		
	M.	F.	Total.	M.	F.	Total.	M.	F.	M.	F.	M.	F.	M.	F.	Total.
1881	157	7	164	204	26	230	3	1	...	...	1	...	16	1	17
1882	133	11	144	223	21	244	2	...	...	...	...	...	6	1	7
1883	113	10	123	140	8	148	3	...	...	...	...	...	12	2	14
1884	126	5	131	175	12	187	5	...	...	...	1	...	23	...	23
1885	112	8	120	183	6	189	13	...	...	...	...	...	12	...	12
1886	85	4	89	177	9	186	2	...	...	...	1	...	13	2	15
1887	100	4	104	240	9	249	8	...	...	...	...	...	14	1	15
1888	159	7	166	265	14	279	34	1	...	...	1	1	43	2	45
1889	167	7	174	245	17	262	25	1	...	...	2	1	32	1	33
1890	209	4	213	222	12	234	4	...	...	...	...	...	47	4	51
1891	225	6	231	250	12	262	12	...	...	...	1	...	6	...	6

Statement II.—Showing the religion of the convicts admitted into the Cuttack Jail during the years 1881—91.

Years.	Christians.						Muhammadans.		Hindus and Shikhs.		Budhist and Jains.		All other classes.	
	Europeans.		Eurasians.		Natives.									
	M.	F.	M	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
1881	...	...	...	...	1	...	10	1	123	13	...	...	88	
1882	...	...	...	...	...	...	10	...	153	9	...	...	86	4
1883	...	...	..	...	3	...	35	...	209	10	...	...	3	
1884	...	...	1	...	3	1	31	1	271	14				
1885	...	...	2	...	2	...	43	1	286	9	...	...	3	
1886	...	...	2	...	2	...	43	2	239	19				
1887	...	...	1	...	3	1	62	1	360	15				
1888	...	...	...	...	6	...	45	...	441	25	...	...	20	
1889	...	...	...	...	5	1	56	4	466	41				
1890	...	...	...	...	1	...	60	4	330	14				
1891	...	...	...	...	5	...	43	...	329	22				

Statement III.—Showing the age of the convicts admitted into the Cuttack Jail during the years 1881—91.

YEARS.	Under 16 years.		16 to 40 years.		40 to 60 years.		Above 60 years.	
	M.	F.	M.	F.	M.	F.	M.	F.
1881	1	...	194	11	24	8	3	
1882	1	...	188	9	50	8	10	1
1883	2	...	210	9	34	1	4	
1884	4	...	252	15	45	1	5	
1885	6	...	252	8	64	...	14	2
1886	8	...	232	17	47	4	4	
1887	9	...	333	12	91	5	13	
1888	23	1	373	15	90	7	6	2
1889	17	1	388	38	104	8	18	4
1890	7	1	285	11	89	6	10	
1891	8	...	290	11	72	9	12	2

Statement IV.—Showing the previous occupation of the convicts admitted into the Cuttack Jail during the years 1881—1891.

YEARS.	MALES.							FEMALES.				TOTAL.		
	Persons employed under Government or Municipal or other local authorities.	Professional persons.	Persons in service or performing personal offices.	Persons engaged in agriculture and with animals.	Persons engaged in commerce and trade.	Persons employed in mechanical arts, manufactures and engineering operations, &c., &c.	Miscellaneous persons not classed otherwise.	Married.	Unmarried.	Widows.	Prostitutes.	Male.	Female.	Total.
1881 ...	2	6	...	132	9	...	78	1	1	10	2	222	14	236
1882 ...	15	3	20	126	12	...	73	5	...	7	1	249	13	262
1883 ...	21	18	11	143	3	2	52	3	...	7	...	250	10	260
1884 ...	7	28	20	154	11	8	78	7	...	8	1	306	16	322
1885 ...	26	47	30	87	13	10	128	1	...	7	2	330	10	340
1886 ...	31	19	43	77	30	4	82	7	...	9	5	286	21	307
1887 ...	20	6	77	129	35	14	165	4	1	11	1	446	17	463
1888 ...	25	3	37	109	50	1	168	6	2	14	3	492	25	517
1889 ...	19	...	68	155	68	...	219	16	1	23	6	527	46	573
1890 ...	15	3	7	128	7	2	220	10	1	6	1	391	18	409
1891 ...	18	3	...	184	1	...	171	4	2	12	4	377	22	399

Statement V.—Showing the employment of convicts in the Cuttack Jail during the years 1881—1891.

YEARS.	AVERAGE NUMBER EMPLOYED ON WORKING DAYS.												Number of prisoners hired out to municipalities, private individuals, or departments other than the Public Works Department.
	On unremunerative labour.	ON PRISON DUTIES.					ON JAIL BUILDINGS.				Manufactures.	Public works.	
							Additions and alterations.		New jails.				
		Prison officers.	Prison servants.	Gardening.	Employed in preparing articles for use or consumption in jails, e.g., wheat grinding, manufacturing of jail clothing.	Jail repairs.	Under Superintendent.	Under Public Works Department.	Under Superintendent.	Under Public Works Department.			
1881 ...	0·60	11·09	17·09	14·06	1·13	2·91	2·98	7·19	...	...	137·22	1·18*	......
1882 ...	0·61	13·87	18·17	17·96	2·15	0·90	2·85	16·50	...	...	173·67	0·82*	......
1883 ...	0·23	14·20	19·58	13·23	2·84	2·72	6·00	5·84	...	...	158·12	...	......
1884 ...	0·10	13·42	17·95	11·84	3·88	0·67	7·16	5·61	...	...	165·58	..	......
1885 ...	0·24	14·08	16·37	12·54	3·19	...	5·16	...	...	...	141·45	...	......
1886 ...	...	14·88	16·78	9·81	4·09	1·76	7·30	...	...	...	132·05	...	......
1887 ...	0·38	8·83	18·58	9·21	5·72	0·43	3·16	...	...	...	102·61	...	......
1888 ...	2·51	14·94	18·84	11·79	9·40	6·01	...	..	...	...	155·78	...	......
1889 ...	68·41	13·36	19·75	15·90	13·27	3·77	1·11	0·67	...	...	72·52	...	1·89
1890 ...	11·20	11·29	16·70	24·32	8·71	1·26	2·86	...	...	...	99·08	...	......
1891 ...	2·63	12·01	17·30	16·08	6·95	...	8·90	...	...	...	139·29	...	......

* Hired by the Municipality for clearing a tank near the Jail.

APPENDIX XV.

EDUCATIONAL STATISTICS.

From an old Settlement Report dated the 1st June 1847, I find that 8 schools only had then been established throughout the whole province of Orissa viz., 3 in Balasore, 3 in Cuttack and 2 in Puri. That such schools did not at the outset meet with any favour may be gathered from the report of Mr. Commissioner Mills who, in referring to them at the time, remarks that with the exception of Balasore his hopes had not been realized; at the same time he does not despair of eventual success. The statement below giving comparative statistics for all classes of schools for 1890-91 will show how far that success has been attained. The figures speak for themselves and need no further comment—

Class of institution.	Number of schools.	Number of pupils.	Average number of pupils per school.
Public Institutions.			
Secondary ... High English ...	5	698	139·6
Secondary ... Middle do. ...	26	1,383	53·2
Secondary ... Do. vernacular ...	7	328	46·8
Primary ... Upper primary ...	126	3,947	31·3
Primary ... Lower do.	4,053	56,688	13·9
Special	13	74	5·7
Female	36	858	23·8
Total ...	4,266	63,976	15
Private Institutions.			
(1) Advanced teaching—			
(*a*) Arabic or Persian	41	582	14·1
(*b*) Sanskrit	21	186	8·8
(2) Elementary teaching—			
A vernacular only or mainly—			
(*a*) With upwards of 10 pupils ...	...	...	...
(*b*) With less than 10 pupils ...	140	944	6·7
(3) Elementary teaching the Koran only ...	...	...	...
(4) Other schools not conforming to departmental standard	6	81	13·5
Total ...	208	1,793	8·6
Grand Total ...	4,474	65,769	14·7

In dealing with the education of the agricultural classes, the higher schools have to be left out of account, as the children of the raiyats receive their education chiefly in primary schools. From old reports in the different subdivisions of the district, I find that great difficulty was experienced by Government at the outset in introducing education among the villagers. The Urya raiyats could not understand why Government should take such a deep interest in their welfare as to give aid to the schools in their villages and pay monthly stipends to their *abadhans*. An ulterior object on the part of Government was suspected, and the result was that in some places the aided *chatsalies* or *patshalas*, as they are called in Lower Bengal, were closed, and the very sight of the Sub-Inspector seemed to instil great dread into the minds of the villagers. Such then was the appreciation of education by the village community. Its value, though still underrated and regarded with some indifference, is by no means wholly ignored now. There have been many instances of unaided schools having risen in villages only through the incentive given by the presence of the aided *chatsalies*, showing obviously that there is a growing tendency among the people to have their children educated. The benefits conferred, however, by primary education have scarcely up to this placed the raiyats on a stronger footing in their relation to their landlords. The evil has been that boys who receive this education forsake the calling of their fathers, and whereas in the capacity of enlightened cultivators they may raise the whole status of the raiyats class, they rather take to clerical work in offices, and the tenant class thus losing its *alumni* continues still in ignorance.

The following statement compiled from the reports of the Joint-Inspector of Schools compares the statistics of the primary schools for boys for the decade 1880 to 1890:—

YEAR.		Number of schools.	Number of pupils.
1880-81	...	3.153	30,542
1881 82	...	3,795	39,987
1882-83	...	4,745	51,961
1883-84	...	4,775	52,656
1884-85	...	4,623	61,296
1885-86	...	3,932	61,371
1886-87	...	4,107	60,829
1887-88	...	4,216	62,830
1888-89	...	4,282	64,658
1889-90	...	3,981	57,070

It will be seen that there has been a decrease in certain years, which has been chiefly confined to the lower primary schools, and which has been generally brought about among other causes by the pressure of scarcity of food in certain tracts of the district producing occasional distress among the poorer classes.

Now, taking the figures for the year 1889-90, it will be found that there were 3,981 schools in the district. This distributed over 16,412 villages would give one school to four villages. In the annual report of the Educational Department for 1889-90, the number of boys of school-going age is given as 127,388, being 15 per cent. of the male population, which is there given as 849,254. From the above table it will be seen that the number of male pupils attending primary schools for the same year is 57,070. The percentage therefore of boys attending primary schools to boys of school-going age is nearly 45. This percentage would, I believe, compare very favourably with the percentage of many other districts in Bengal. It may be further added that in ascertaining the relative progress of education in primary schools by comparing the merit marks assigned by the Director of Public Instruction with the population in 1889-90, the first place was assigned to Cuttack in order of merit among all the districts of Bengal.

In connexion with the scheme for lower primary education, I learn from the Joint-Inspector that night schools were opened in August 1884 for the purpose of giving instruction to *bonâ fide* labourers. In the very first year, *i.e.*, during a period of eight months from August to March, no less than 72 schools were established attended by 1,262 labourers. Though the number of such schools now is not very large, still there has been a steady increase since their establishment, as will be seen from the following statement:—

Night schools for labourers.

YEAR.		Number of night schools.	Roll number.
1884-85	...	72	1,262
1885-86	...	119	1,908
1886-87	...	186	2,639
1887-88	...	248	3,381
1888-89	...	227	2,953
1889-90	...	197	2,270
1890-91	...	190	2,274

In the same year as the night schools were opened, a movement was set on foot for establishing special schools for the children of the low castes, such as Bauris, Pans and Kandras, who were handicapped in attending schools which received children of higher castes to whom their touch was pollution. Six such stipendiary schools were established in 1884-85 in places where the low castes were found in large numbers, and were attended by 129 pupils. Since then the number has been fluctuating, as will be observed from the subjoined statement. It should, however, be remembered that the number on the roll given in the statement does not in any way represent the total number of children of the lower castes attending all schools. In 1886-87 the total number of such children was 2,503:—

Special schools for low-caste children.

YEAR.	Number of schools.	Roll number.
1884-85 ...	6	129
1885-86 ...	13	223
1886-87 ...	29	562
1887-88 ...	19	359
1888-89 ...	18	347
1889-90 ...	13	226
1890-91 ...	7	144

APPENDIX XVI.

STATISTICS OF THE CIVIL COURTS.

The statistics of rent suits have been given in Appendix VI. Two statements are now appended showing the different kinds of civil suits and their value instituted in the several courts of the district. The figures have been obtained by me from the District Judge of Cuttack.

Statement I.—Showing the number of suits instituted from 1880 *to* 1890.

Detail of Courts.	Number of Suits.																						
	Suits for money or moveables.											Title and other suits.											
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
District Judge of Cuttack	...	...	...	1	...	...	2	...	...	...	...	8	1	1	1	...	1	..	1	1	1	...	2
Sub-Judge of Cuttack	36	27	20	57	54	69	51	71	63	57	63	97	50	51	50	23	8	22	32	17	15	6	8
Judge of Small Cause Court, Cuttack ...	2,867	1,160	2,136	1,101	946	833	818	873	623	630	657	...	...	...	...	...	...	...	...	.	.	...	...
Munsif of Cuttack	1,275	2,808	2,726	4,237	4,742	4,855	4,631	4,539	3,394	2,359	2,935	594	408	426	489	206	185	218	222	172	128	78	118
Munsif of Kendrapara	...	..	...	...	...	...	...	...	1,725	2,019	2,033	...	..	. .	...	...	...	...	..	.	84	91	74
Munsif of Jajpur (exclusive of Bhadruck subdivision).	16,01	1,473	1,747	1,858	1,848	2,369	2,111	1,931	1,679	818	1,075	881	737	590	697	580	395	353	306	231	224	121	137
Total ...	5,779	5,468	6,629	7,244	7,592	8,135	7,513	7,404	7,684	6,373	6,753	1,574	1,196	1,068	1,237	809	589	593	561	421	407	296	339

Statement II.—Showing the value of suits instituted during the years 1880—90.

Detail of Courts.	Value of Suits.										
	Suits for money or moveables.										
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
District Judge of Cuttack.	...	...	...	894	...	...	132	...	...	...	...
Subordinate Judge of Cuttack.	82,329	79,347	44,935	1,76,363	2,41,998	2,33,998	1,86,430	2,75,696	2,61,688	3,94,504	2,54,988
Judge of Small Cause Court, Cuttack.	1,58,523	1,28,979	1,43,645	1,35,775	1,17,409	1,12,666	1,00,051	1,11,539	77,733	79,436	80,977
Munsif of Cuttack ...	27,070	57,945	50,445	1,06,945	1,29,920	1,50,281	1,46,345	1,45,767	1,26,149	1,13,577	1,06,823
Do. of Kendrapara	..	.	...	...	. .	...	. .	...	64,437	76,566	68,220
Do. of Jajpur (exclusive of Bhadrak subdivision).	55,084	49,426	60,991	72,455	79,605	95,427	92,935	94,304	93,021	45,471	61,996
Total ...	3,23,006	3,15,697	3,00,016	4,92,432	5,68,932	5,92,372	5,25,893	6,27,306	6,23,028	7,09,553	5,73,004

Detail of Courts.	Value of Suits.										
	Title and other suits.										
	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
District Judge of Cuttack.	...	150	...	...	...	...	51,82,282	...	...	...	1,000
Subordinate Judge of Cuttack.	8,08,209	1,93,653	3,06,542	5,40,028	1,19,378	1,07,230	7,02,874	4,17,924	1,76,115	19,753	54,297
Judge of Small Cause Court, Cuttack.	...	...	...	...	...	...	...	...	...	...	...
Munsif of Cuttack ...	41,951	45,497	58,989	34,921	13,187	17,824	24,121	12,046	9,584	7,384	9,310
Do. of Kendrapara.	...	.	...	...	...	...	...	...	2,119	5,015	3,597
Do. of Jajpur (exclusive of Bhadrak subdivision).	34,827	34,360	37,457	21,352	13,826	14,277	14,423	9,821	12,749	7,104	8,636
Total ...	8,84,987	2,73,660	4,02,988	5,96,301	1,46,391	1,39,337	60,13,700	4,39,791	2,00,567	39,256	76,840

SUGGESTIONS.

The question of material improvements is always a large one, and especially so in a district like Cuttack, which has been so open to the ravages of drought and famine. I have attempted to indicate in the body of this report the directions in which certain improvements may be effected. It remains now to add a few concluding remarks which have not found a suitable place in the preceding pages of the report.

Crop experiments.—The introduction of new crops and the improvement of existing crops suggests itself to me as one of the chief wants of the district. Although rice may be the mainstay of the people, and every means should therefore be taken to ensure the success of the paddy harvest, this should not in any way preclude the peasant from running his energies into other directions, so that in a bad rice year other crops perhaps equally productive may take their place. Without making experiments it is difficult to say what new crops should be cultivated in the district. Their general introduction would take time not only as waiting the results of experiments, but as having to combat with a natural disinclination of the people to innovation. The raiyat very rightly wishes to work on in his old grooves, because he is not rich enough to try experiments. He must be as sure of his crop as possible, otherwise he may have to starve. In other words, his scanty means give him no scope for the trial of new crops, and his natural apathy to change of any kind convinces him that his inherited ideas suit him better than all scientific facts. Hence a rises the responsibility of introducing new crops and attempting new experiments, and the great need of caution and care in setting aside old customs. Such difficulties, which exist in all parts of India, are at this time enhanced in the districts of the Orissa Division, where a new settlement looms over the heads of the zamindars and cultivators. Every suggestion, however sympathetic, is regarded with suspicion, and every effort to make the land more remunerative is likely to be looked upon as a trick to increase the assessments. The improvement of land may be therefore said to be at this time one of the pet aversions of the zamindar. The raiyat follows suit, and while the zamindar fears an enhancement of the revenue, the raiyat trembles under the idea that the slightest change in the existing state of things means for him an enhancement of rent. Such are the difficulties presented to those who would improve the agriculture of the district, but I am by no means inclined to consider them insurmountable. The problem to be solved is, how to improve the present crops of the district and what crops to introduce into the district. I would venture to say, that this cannot be done satisfactorily without the establishment of a farm, where experiments may be conducted under proper supervision. The results obtained in such a farm would afford lessons, which would be found useful in teaching the raiyats, that crops other than those already grown by them, may be cultivated with profit, and that their existing crops may be improved by judicious manuring, by selection of good seed and by improved tillage. Experiments have already been made by me in some of the Wards' Estates of the district, where in some cases encouraging results have been obtained with fresh varieties of cane and cotton, with fine paddy, groundnuts, and potatoes; but such experiments have been conducted on a limited scale and require to be elaborated and given publicity by the establishment of an experimental farm in the district, which would serve as a school of agricultural education for the raiyats of Cuttack, and in fact for the raiyats of the Orissa Division. Having had the opportunity of touring over the district, I would suggest that such a farm be located at Madhupur on the High Level Canal, where the costs of the experiments could perhaps be defrayed from the funds of that estate. The site, besides having the advantages of canal water for irrigation and easy communication, would occupy a good central position in Orissa, and could be placed under the supervision of the Manager of the estate.

Seed depôt.—In connexion with such a central farm, I would advocate the establishment of a seed depôt, so that the best procurable seed of the important crops of the district may be placed within the reach of the cultivators, and new seed may be distributed among them which, on trial on the farm, have been found to suit the conditions of the district. The Agricultural Department and the District Board may well co-operate in this matter and share the expenditure that would be incurred in the establishment of such a depôt. The distribution of seed at the outset would perhaps have to be made *gratis*, but when once started there is no reason why the depôt should not in time yield a reasonable income.

Implement depôt.—In addition to a seed depôt, there might also be an implement depôt, where a small stock of improved implements may be kept to be hired out to raiyats on moderate terms. In making this suggestion, I have in my mind the hiring out of sugarcane crushing mills, which have made such headway in all the important districts of Bengal. Messrs. Thomson and Mylne or Renwick & Co. would, I believe, be ready to establish such a depôt in Orissa. Should efforts be made by this Department to popularize the use of the machine among Uriyas From the favour with which the will has been accepted in Madhupur, I have little doubt but that an undertaking of this kind would be found to be as profitable in Orissa as in some other districts of Bengal, where the machines have been introduced.

Instruction in jails.—Besides such a farm, the jails of the district may be utilised for imparting agricultural instruction to the raiyats. From the returns of jail statistics given in the Appendix, it will be seen that the majority of prisoners are agriculturists. It is not always of practical use to them to learn good carpentry, improved weaving or fancy wicker-work, for on their release from prison they are more likely to follow their ancestral vocation than to adopt a new calling into which they have been initiated during their incarceration. The usefulness of instruction in industrial arts should not be depreciated, but what may well be urged is that agricultural instruction should have a place side by side with industrial instruction in jails

Such instruction may be given by means of experiments. Small plots adjoining the jail may be reserved for experimental purposes, where improved cultivation may be carried on by convicts under the instructions issued from the central farm. The supervision of this cultivation could be placed in the hands of the overseer of the central farm.

Arboriculture.—Besides the efforts made to improve the agriculture proper of the district, steps might be taken to effect some improvements in its arboriculture. The jungles of the district consist more or less of low scrub, much of which could be profitably replaced by good timber trees, such as teak or mahogany. The planting of these trees along roadsides would also be a profitable undertaking. The cultivation of the date-sugar palm (*Phœnix sylvestris*) and of the betelnut (*Areca catech*) may be extended. At present, the date-palm tree is used solely for toddy, the manufacture of date-sugar being an industry unknown to the district. The Muhammadans of Jessore and other neighbouring districts pay great attention to their date plantations, and it would be well if their brethren in Cuttack would follow their example. Betelnut is an article of consumption in great demand in Cuttack. There is scarcely an Uriya who does not chew the nut, and yet large quantities of betelnut are annually imported owing to the practical absence of betelnut trees in the district. The cultivation of mulberry trees may also be added to the list of improvements. *Tusar* silk-worms are found near the hills of the Tributary States of Orissa, and are likely therefore to thrive well along the western frontier of the district. It would repay the trouble and expenditure, to try the experiment of growing mulberry trees on the proposed central farm.

Cattle and Cattle disease.—I have already pointed out, that fodder is badly wanted for the cattle of Cuttack, and that, until the animals have adequate food, it is impossible to effect any material improvement in their condition. If, however, it is thought, that in some places, artificial food can be made to take the place of fodder grasses, I would suggest the crossing of local country cows with a properly selected bull. The bull required for the purpose would be a small sturdy animal, and not one of those huge noble beasts to be met with in the Punjab. A suitable animal may probably be procured from Burma, where the height of the bulls, I am told, is such as to make them good *mates* for crossing with Bengal cows. Two or three such bulls may well be imported by the Wards' Estates of the district. From the returns of cattle disease, given in the preceding pages of the report, it will be seen, that the mortality in Cuttack is higher than that in any other district of Bengal. This fact may therefore be well brought to the notice of the Superintendent of the Civil Veterinary Department of Bengal, so that a thorough investigation may be held by him and his subordinates at the next serious outbreak of disease. From the cases which have come under my notice, I am inclined to believe that *rinderpest* is the disease to be most dreaded. The blood of animals dying from the disease may be examined by the officer in charge of the Bacteriological Laboratory established by the Government of India. To make an examination of this kind convenient, small animals, such as rabbits and Guinea pigs or white mice, would have to be inoculated with the poisonous blood of dead animals, and sent off to the Laboratory with all possible speed.

Emigration.—In the above suggestions, I have elaborated no regular scheme of improvement, but have only sketched briefly the lines in which some good may be done to advance the condition of the people. I would only add, that some relief may also be afforded by the migration of the Uriyas from their homes. From the Census Returns, which will be found in a preceding page, it will be found that the density of the population is high, and that there is nothing to relieve the congestion of the district. There is a small movement which takes the form of temporary emigration, but this is very insignificant. What is required is migration in large numbers, so that land may be set free. It may be well therefore for Government to consider whether migration from Cuttack to Burma may be encouraged in the same way as has been done in Bihar. Zamindars of Cuttack, like the Maharaja of Burdwan, would not find it difficult to purchase lands in Burma, and it would, I think, pay them to settle Uriyas on such lands.

R. D'R & others—Reg. No. 4661J—528—17-3-93.